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### NOTES ON NORTH AMERICAN TREES, IX<sup>1</sup>

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#### NEW SPECIES AND VARIETIES OF CRATAEGUS

##### *Crataegus cherokeensis* (§*Crus-galli*), n. sp.

Leaves oblong-obovate, rounded or acute at apex, gradually narrowed and cuneate at base, finely, often doubly serrate usually only to the middle with acute teeth thickened at apex, glabrous with the exception of a few hairs on the upper side of the midrib early in the season, thin, dark green and lustrous above, paler below, 3.5–4 cm. long, 1.5–2 cm. wide, with a slender midrib and thin obscure primary veins, on vigorous leading shoots usually acute at apex, often acutely lobed above the middle, 4–5 cm. long and 3.5–4 cm. wide; petioles slender, often wing-margined nearly to the base, glabrous, 5–7 or on vigorous shoots up to 10–12 mm. in length. Flowers opening early in April, 10–12 mm. in diameter, on slender glabrous pedicels, in 5–7-flowered globose glabrous corymbs; calyx-tube narrow-obconic, glabrous, the lobes slender, gradually narrowed from the base, long-acuminate, entire or slightly and irregularly toothed above the middle, glabrous; stamens 10, anthers red; styles 1–3, usually 2. Fruit ripening late in September, ellipsoidal, dull orange-red, 10 mm. long, 6–7 mm. thick, the persistent calyx sessile or raised on a short tube; nutlets narrowed and rounded at the ends, only slightly ridged on the back, 6–8 mm. long and 3–5 mm. wide, the narrow hypostyle extending to below the middle.

A small tree with dark slightly scaly bark and slender glabrous often distinctly zigzag branchlets red-brown or orange-brown during their first year, later becoming dark gray-brown, and armed with numerous straight slender spines 3–4 cm. in length.

TEXAS. Cherokee County, upland thickets near Larissa, *E. J. Palmer*, No. 9371 (2), April 7, 1916, type for flowers, No. 10704 (2), September 14, 1916, type for fruit, No. 9372 (2 A), April 7, 1916, (with pink anthers) No. 10705 (2 A), September 14, 1916.

<sup>1</sup>For part VIII see vol. II p. 164.

The narrow oblong-obovate finely serrate leaves and ellipsoidal fruit distinguish this species from *C. Reverchonii* Sargent of the Dallas region of Texas, with nearly orbicular coarsely serrate leaves and smaller globose fruit, the only *Crus-galli* species with glabrous corymbs, 10 stamens and red or pink anthers which has been found before in the Arkansas, western Louisiana and Texas region.

***Crataegus phaneroneura* (§*Crus-galli*), n. sp.**

Leaves oblong-obovate, rounded, acute or abruptly short-pointed at apex, gradually narrowed and cuneate at base, finely often doubly serrate usually only to the middle with straight or slightly incurved teeth callous at apex, glabrous with the exception of a few hairs on the upper side of the midrib early in the season, fully grown when the flowers open, 5-7 cm. long and 2.5-3.5 cm. wide, with a slender midrib and 7-10 pairs of thin conspicuous primary veins; petioles slender, sparingly villose on the upper side early in the season, soon glabrous, 8-10 mm. in length; leaves on vigorous leading shoots rarely elliptic, more coarsely serrate, upper to 9 cm. long and 5 cm. wide. Flowers appearing from the middle to the 20th of May, 1.5 cm. in diameter, in broad loose 10-20-flowered, slightly villose or nearly glabrous corymbs; calyx-tube narrow-obconic, glabrous, the lobes slender, acuminate, entire, glabrous; stamens 5 or 6, anthers cream color; styles 1-3. Fruit ripening the end of September in long-branched drooping few-fruited clusters, subglobose, dull red, 10-12 mm. in diameter, with thin dry flesh, the calyx not enlarged, with a broad shallow cavity rounded in the bottom; nutlets rounded at the broad ends, only slightly ridged on the back, 6-7 mm. long and 5 mm. wide, the narrow hypostyle extending to the middle.

A tree 5-7m. high, with a trunk 18-20 cm. in diameter, spreading and erect branches forming an open narrow head, and stout nearly straight branchlets covered when they first appear with matted pale hairs, soon glabrous, light reddish brown during their first season, becoming reddish or gray-brown and armed with many stout or slender straight or slightly curved purple or gray spines 5-6 cm. in length.

MISSOURI. Pike County, hillsides, Clarksville, *John Davis*, No. 1466. November 23, 1912, No. 1468, September 23, 1912, No. 1474, May 20 and September 23, 1912 (type), No. 1475, May 20, 1912, with glabrous corymbs and young branches.

This handsome plant is easily distinguished from all related species in the more numerous and conspicuous primary veins of the leaves which are similar in the form with villose corymbs and young branchlets which is here considered the type, and in the glabrous form which when the tree is better known will probably be best considered a distinct variety.



***Crataegus lawrencensis* (§*Crus-galli*), n. sp.**

Leaves oblong-obovate, acute at apex and concave-cuneate at base, or occasionally broad-elliptic and rounded at apex and rarely at base, coarsely often doubly serrate usually only to the middle with broad callus-tipped teeth, and rarely furnished with short lateral lobes, thin, dark yellow-green on the upper surface, pale on the lower surface, glabrous with the exception of a few hairs on the upper side of the midrib, 4-6 cm. long and 2-3.5 cm. wide, and on leading shoots up to 7 cm. long and 4 cm. wide; petioles slender, wing-margined often nearly to the base, slightly villose on the upper side, 1-1.5 cm. in length. Flowers appearing at the end of April, 1.5 cm. in diameter, on slender glabrous pedicels, in 5-10-flowered glabrous corymbs; calyx-tube broad-obconic, glabrous, the lobes gradually or abruptly narrowed from a wide base, slender, long-acuminate, entire or furnished with an occasional tooth, glabrous; stamens about 15; anthers deep rose color; styles 3. Fruit ripening early in October, in slender-branched drooping clusters, subglobose, green tinged with red, about 5 mm. in diameter, the calyx prominent, with a broad shallow cavity; flesh thin, hard and dry; nutlets 3, broad and rounded at the ends, rounded and rarely slightly ridged on the back, about 5 mm. long and 3-5 mm. broad, the narrow hypostyle extending to the middle.

A small tree with irregularly spreading branches, dark brown scaly bark and slender nearly straight chestnut-brown branchlets becoming dark gray-brown in their second year, and sparingly armed with slender straight spines 2.5-3 cm. in length.

MISSOURI. Lawrence County, La Russell, *E. J. Palmer*, No. 1, April 22, and October 10, 1908 (type). Jasper County, Webb City, *E. J. Palmer*, No. 18, April 5, 1903.

***Crataegus limnophila* (§*Crus-galli*), n. sp.**

Leaves oblong-obovate, rounded or acute and often apiculate at apex, gradually narrowed and cuneate at base, finely crenulate-serrate above the middle, glabrous with the exception of a few hairs on the upper side of the midrib early in the season, thin, dark green and lustrous above, pale below, 3.5-4 cm. long, 1-1.5 cm. wide and nearly fully grown when the flowers open; petioles slender, glabrous, slightly wing-margined, 5-6 mm. in length; leaves on vigorous shoots broad-obovate, more coarsely serrate and up to 5 cm. long and 1.5 cm. wide. Flowers opening early in April, about 1 cm. in diameter, on slender pedicels in small compact usually 7 to 10-flowered sparingly villose corymbs; calyx-tube narrow-obconic, glabrous, the lobes slender, short-acuminate, entire, glabrous on the outer surface, villose on the inner surface; stamens 15-20, anthers dark rose color; styles usually 3-5. Fruit ripening the end of September, in few-fruited erect glabrous clusters, ellipsoidal, bright red, 7-9 mm. long and 6 or 7 mm. thick, with thin dry flesh, the calyx little enlarged, with a deep narrow cavity pointed in the bottom; nutlets 3-5, broad and rounded at base, narrowed at apex, about 5 mm. long and 3 or 4 mm. wide, the broad hypostyle expanding nearly to the base.

A tree 8 or 9 m. high with a trunk 18–20 cm. in diameter covered with gray bark divided by shallow fissures, spreading pale ashy gray branches forming a broad round-topped head, and slender branchlets sparingly villose, soon glabrous, and dark red-brown in their first season, becoming lighter in their second year and ultimately gray, and armed with occasional slender straight spines 2.5–3 cm. in length.

FLORIDA. Wakulla County, in the water of deep swamps and in low wet woods near St. Marks, *T. G. Harbison*, Nos. 1206 and 1208, September 25, 1913, No. 1428, March 30, 1914, No. 5692, April 13, 1920 (type), No. 5697, April 14, 1920, with glabrous corymbs and young branchlets.

A plant of the *Crus-galli* Group growing in wet soil has not before been reported. The small flowers in small compact corymbs, the small ellipsoidal fruit and slender branches well distinguish this species. *Crus-galli* species are rare in the coast region of the southeastern states, and from Florida only *C. pyracanthoides* Beadle with 5–10 stamens has been previously described.

***Crataegus sublobulata* (§*Crus-galli*), n. sp.**

Leaves broad-obovate to elliptic, acute or rounded at apex, abruptly or gradually narrowed and cuneate at base, coarsely, deeply and irregularly serrate with acuminate teeth, and often sublobulate with acuminate lobules, tinged with red and covered above with short white hairs deciduous before the flowers open except from the upper side of the midrib, glabrous at maturity, thick, dark green and lustrous on the upper surface, paler on the lower surface, 3.5–4 cm. long, 2.5–3 cm. wide, with a stout midrib and prominent primary veins, or on vigorous shoots often 4–5 cm. long and 3.5 cm. wide; petioles stout, wing-margined often nearly to the middle, grooved and villose-pubescent on the upper side, 1–1.2 cm. or on leading shoots up to 2 cm. in length. Flowers opening late in March and early in April, 1.5 cm. in diameter, on slender glabrous pedicels, in 5- or 6-flowered compact corymbs; calyx-tube narrow-obconic, glabrous, the lobes slender, acuminate, entire or furnished above the middle with occasional slender teeth, glabrous on the outer surface, sparingly villose-pubescent on the inner surface; stamens 20; anthers pink; styles 2–5. Fruit short-oblong to subglobose or rarely to obovoid, orange-red, 8–10 mm. long and 6 or 7 mm. broad; nutlets usually broader at apex than at base, prominently ridged on the back, 5–7 mm. long and 3–5 mm. wide, the broad hypostyle extending to below the middle and often nearly to the base.

A round-topped tree 8–10 m. high, with a short trunk covered with soft corky slightly ridged gray-brown bark, wide-spreading branches and slender slightly zigzag branchlets light reddish brown and glabrous when they first appear, becoming darker during their first season and light gray-brown the following year, and armed with numerous slender straight chestnut-brown lustrous spines, becoming dull gray-brown and 2.5–4 cm. in length.



TEXAS. San Augustine County, borders of upland woods near San Augustine, *E. J. Palmer*, No. 10617 (2), September 17, 1916, No. 13239 (No. 2), April 1, 1918 (type).

The distinct character in this species is the deep serration of the leaves, unusual in plants of the *Crus-galli* Group. From *C. Bushii* Sargent, the species of southern Arkansas, western Louisiana and eastern Texas with 20 stamens and rose-colored anthers it is well distinguished by the shape of the leaves.

*Crataegus intermixta* (§*Crus-galli*), n. sp.

Leaves elliptic to slightly obovate, acute, abruptly short-pointed or rarely rounded at apex, gradually narrowed and cuneate at base, sharply and doubly serrate above the middle with erect acuminate teeth, and on leading shoots occasionally slightly lobed, glabrous, thin, 4-5 cm. long and 2-2.5 cm. wide, with a thin midrib and 4 or 5 pairs of slender prominent primary veins; petioles slender, slightly wing-margined toward the apex, sparingly glandular, 1-1.5 cm. in length. Flowers appearing from the middle to the 20th of May, about 1 cm. in diameter, on slender pedicels, in globose usually 5-10-flowered compact corymbs; calyx-tube broad-obconic, glabrous, the lobes short, gradually narrowed, serrate above the middle with occasional glandular teeth, glabrous on the outer surface, soft-pubescent on the inner surface; stamens 20; anthers pink; styles 1-3. Fruit ripening the end of October, subglobose to slightly obovoid, dark orange-red, 10-12 mm. in diameter, crowned with the only slightly enlarged calyx, with a deep cavity wide in the bottom, and firm hard flesh; nutlets 2-3, rounded at the gradually narrowed ends, about 8 mm. long and 5 mm. wide, with a low broad dorsal ridge; the narrow dark hypostyle extending to the middle.

A round-topped tree 5-6 m. high, with wide-spreading branches, a trunk 17-25 cm. in diameter, dark scaly bark and slender glabrous slightly zigzag branchlets dark orange-brown or reddish and lustrous in their first season, becoming dull gray-brown and armed with many slender nearly straight spines 3-5 cm. in length.

MISSOURI. Marion County, uplands, Riverside Park, Hannibal, *John Davis*, No. 6, October 21, 1912, October 13, 1913, May 19, 1913 (type).

This plant has the thin acute sharply serrate leaves of many of the *Virides* species to which it bears a strong resemblance; the pink anthers, however, are unusual in that group except in the extreme south, and the 1-3 styles, the large solid fruit, the shape of the nutlets, the numerous, long spines and the rough bark all point to the *Crus-galli* Group to which it is now doubtfully referred.

*Crataegus araioclada* (§*Crus-galli*), n. sp.

Leaves oblong-obovate, acute or very rarely rounded at apex, gradually narrowed and cuneate at base, finely serrate above the middle with blunt or acute teeth, occasionally slightly and irregularly lobed, especially on leading shoots, thin, glabrous with the exception of a few hairs early

in the season on the upper side of the midrib, lustrous, 4-5 cm. long, 1.5-2 cm. wide and on leading shoots up to 6 cm. long and 4 cm. wide, with a slender midrib and thin primary veins; petioles slender, slightly wing-margined, glabrous or pubescent on the upper side early in the season, especially on leading shoots, 1-1.5 cm. in length. Flowers appearing the middle of April, 1.5 cm. in diameter, on slender glabrous pedicels, in small compact usually 5- or 6-flowered corymbs; calyx-tube broad-obconic, glabrous, the lobes gradually narrowed from the base, slender, acuminate, entire, glabrous on the outer surface, pubescent on the inner surface; stamens 20, anthers yellow; styles 3-5. Fruit (only one collected) ripening in October, in drooping few-fruited clusters, short-oblong, dull orange-red, 8-10 mm. in diameter, the calyx not enlarged, with a narrow shallow cavity pointed in the bottom.

A tree 4 or 5 m. high, with a trunk 35 cm. in diameter, covered with dark, slightly scaly bark divided into narrow ridges, a wide flat-topped head, and slender slightly zigzag glabrous branchlets bright chestnut brown or orange-brown during their first season and pale gray-brown the following year, and armed with many slender straight chestnut-brown spines 3-4 cm. in length.

LOUISIANA. Natchitoches Parish, border of upland woods Natchitoches, E. J. Palmer, Nos. 7234 (3) and 8848 (3), April 16 and October 6, 1915 (type).

This species seems distinct from the described species of the *Crus-galli* Group with glabrous corymbs, 20 stamens and yellow anthers, in its thin leaves lobed on vigorous shoots, in its compact few-flowered corymbs and slender branchlets. In the shape of the thin leaves and in the lobing of these on vigorous shoots, and in its slender branchlets it resembles species of the *Virides* Group, but the numerous spines and the hard dry fruit seem to place it in the *Crus-galli* Group.

*Crataegus subpilosa* (§*Crus-galli*), n. sp.

Leaves broad-obovate, rounded at apex, gradually narrowed and cuneate at base, finely often doubly serrate to below the middle with straight or slightly incurved callous tipped teeth, slightly pilose on the upper side of the midrib early in the season, otherwise glabrous, thick, dark green and lustrous above, paler below, 4-6 cm. long and 2-3 cm. wide; petioles slender, wing-margined to below the middle, sparingly pilose in May, becoming glabrous, 5-8 mm. in length. Flowers appearing early in May, about 1.2 cm. in diameter, on slender pedicels in compact mostly 12-15-flowered corymbs, like the pedicels slightly pilose; calyx-tube narrow-obconic, glabrous, the lobes slender, long-acuminate, entire, glabrous on the outer surface, sparingly pubescent on the inner surface; stamens 20, anthers pale yellow, styles 2 or 3. Fruit ripening the end of September, in small drooping glabrous clusters, short-oblong to subglobose, dull orange-red, 8-10 mm. in diameter, with thin dry flesh; calyx little enlarged, with a narrow cavity pointed in the bottom; nutlets 2 or 3 narrowed at the rounded ends, ridged on the back with a narrow ridge, 7-8 mm. long and 4-5 mm. wide.



A tree 4.5–5 m. high, with a trunk 20 cm. in diameter, covered with pale gray scaly bark, wide-spreading branches forming a round-topped head and stout branchlets slightly pilose when they first appear, becoming glabrous, orange-brown or dark reddish brown in their second year, and armed with many stout straight purple spines 3.5–5 cm. in length, becoming compound and much elongated on the trunk and large branches.

ARKANSAS. Carroll County, rocky hillsides near Eureka Springs, *E. J. Palmer*, No. 4451 (3), September 23, 1913, No. 5520 (3), May 9, 1914 (type).

This species is most closely related to *Crataegus fera* Beadle of western Louisiana, from which it differs in its much broader and thicker leaves, without the hairs of that species on their upper surface early in the season, in its slightly pilose not densely villose corymbs and in the glabrous calyx-tube.

*Crataegus transmississippiensis* (§Molles), n. sp.

Leaves ovate to oval or elliptic, acute at apex, cuneate or occasionally rounded at base, finely double serrate usually to the base with acuminate callous tipped teeth, and slightly lobed above the middle with short triangular lobes; when they unfold coated above with short white hairs and densely tomentose below, and at maturity thin, glabrous above, slightly pubescent below on the slender midrib and primary veins, 5–6 cm. long and 3.5–4 cm. wide; petioles slender, densely tomentose when they first appear, becoming glabrous or puberulous 1.5–2.5 cm. in length. Flowers opening toward the end of April, in mostly 5–10-flowered small corymbs densely covered, like the pedicels and calyx-tubes, with long matted white hairs; calyx-lobes gradually narrowed from the base, slender, acuminate, laciniately glandular-serrate, villose, more densely on the outer than on the inner surface; stamens 10; anthers yellow; styles usually 3. Fruit ripening early in September, globose, scarlet, 1.5–1.7 cm. in diameter; nutlets usually 3, acute at base, broad and rounded at apex, 5 or 6 mm. long, 4–5 mm. wide.

A tree 6–7 m. tall, with a short trunk covered with furrowed bark, spreading branches forming a round-topped head, and stout branchlets thickly covered when they first appear with long matted white hairs, soon glabrous, dull reddish brown during their first season, becoming dark gray-brown and armed with occasional slender nearly straight spines 3–4 cm. in length.

ARKANSAS. Marion County, glades among rocks in open woods, *E. J. Palmer*, No. 8419 (6), September 1, 1915 (type), Baxter County, near Cotter, No. 17238 (6), April 18, 1920.

MISSOURI. McDonald County, Noel, *E. J. Palmer*, No. 4083, September 2, 1913; *B. F. Bush*, No. 7481, April 22, 1915; Stone County, near Galena, *E. J. Palmer*, No. 17236, April 18, 1920.

In the Molles Group the only species with leaves cuneate at base and flowers with 10 stamens and yellow anthers which has been described is *C. submollis* Sargent of eastern Canada and eastern Maine and Massa-

chusetts, which differs from this Missouri and Arkansas species in its larger more coarsely serrate leaves more deeply divided into acuminate lobes, in its broad many-flowered less densely villose corymbs and pyri-form fruit.

*Crataegus brachyphylla* (§Molles), n. sp.

Leaves broad-ovate, acute or rounded at apex, truncate or rounded at the wide base, coarsely often doubly serrate with straight acuminate teeth, covered above when they unfold with short hairs and below with long matted white hairs persistent during the season, and at maturity thin, yellow-green and glabrous on the upper surface, 5-7 cm. long and 5-6 cm. wide, with a slender midrib and primary veins; petioles slender, thickly covered with matted white hairs early in the season, becoming glabrous or nearly glabrous before autumn, 2-3 cm. in length; leaves on vigorous shoots rounded at apex, cordate at the broad base, slightly and irregularly laterally lobed, coarsely doubly serrate and up to 6-8 cm. long and wide, with petioles 2-3 cm. in length. Flowers 1.5 cm. in diameter, appearing from the first to the tenth of April when the leaves are more than half grown, in small compact 5-8-flowered corymbs densely covered, like the slender pedicels and narrow obconic calyx-tube, with long matted snow white hairs; calyx-lobes narrow, long-acuminate, laciniately glandular-serrate, thickly covered with white hairs; stamens 20, anthers deep rose color. Fruit ripening early in September, on slightly villose pedicels, in erect clusters, subglobose, dull dark red, 10-12 mm. in diameter, with thin flesh, the calyx little enlarged, with a deep narrow cavity pointed in the bottom; nutlets usually 3, acute at base, rounded at the broader apex, only slightly ridged on the back, 6-7 mm. long and 3-4 mm. wide, the broad hypostyle extending to the middle.

A tree 6-7 m. high, with a trunk 15-18 cm. in diameter, spreading branches forming an open irregular head, and slender nearly straight branchlets thickly covered with white hairs when they first appear, nearly glabrous, bright red-brown and lustrous at the end of their first season and pale gray the following year, and armed with occasional straight or slightly curved spines 3-4 cm. long and often unarmed.

ARKANSAS. Hempstead County, dry gravelly ridges in the shade of open woods largely composed of *Quercus Durandii* Buckley and *Q. arkansana* Sargent about five miles northwest of Fulton, *C. S. Sargent*, April, 22, 1901; *B. F. Bush*, No. 151, April 23, 1901, No. 19A, April 26, 1905, No. 5933, October 4, 1909; *E. J. Palmer*, No. 7205 (21), April 12, 1915 (type), No. 3975 (21b), October 19, 1915, No. 9392 (21) and No. 10607 (21), April 8 and September 5, 1916, Nos. 16333 and 16340, September 9, 1919.

This is one of the most distinct species of the Molles Group, differing from the other described species in its comparatively small leaves without lobes except on vigorous shoots, small flowers in small few-flowered corymbs, and small fruit. It is unusual, too, to find a tree of this group growing on dry gravelly hills. In the shape of its leaves and their pubescence it resembles *C. lanuginosa* Sargent from southwestern Missouri,



but the leaves of that species are thicker, distinctly blue-green and usually slightly lobed, its flowers are larger and the calyx cavity of the larger fruit is broader and deeper. *C. lanuginosa* grows on rocky hillsides in open situations, and the branches of few species are furnished with such long and numerous spines.

*Crataegus notha* (*C. apiifolia*  $\times$  *brachyphylla*), n. hyb.

Leaves broad-ovate, acute at apex, abruptly cuneate, rounded or truncate at base, coarsely and sharply doubly serrate usually only above the middle, and slightly and irregularly lobed, when they unfold thickly covered with matted white hairs, and at maturity thin, glabrous above, pubescent below, 3-4 cm. long and 2.5-3 cm. wide, with a thin midrib and slender primary veins occasionally running to the sinuses as well as to the points of the lobes; petioles slender, densely villose early in the season, becoming nearly glabrous, 1.5-3 cm. in length; leaves on vigorous shoots truncate or subcordate at base, more coarsely serrate, usually 3-lobed by deep narrow lateral lobes pointed in the bottom, and up to 5 cm. long and 5-6 cm. wide, with petioles usually about 2.5 cm. in length. Flowers appearing late in March, 1.5-1.7 cm. in diameter, on slender pedicels densely hoary-villose like the compact usually twelve to fifteen-flowered corymbs; calyx-tube narrow-obconic, densely villose, the lobes gradually narrowed from the base, acuminate, glandular, laciniately serrate, slightly villose; stamens 20, anthers deep rose color, styles 2-4. Fruit ripening the end of September, not abundant, on glabrous pedicels, ovoid, bright scarlet, 10 mm. long and 6-8 mm. wide, with soft succulent flesh, the calyx little enlarged with a deep narrow cavity pointed in the bottom; nutlets usually 4, acute at the ends, rounded and occasionally slightly ridged on the back, about 6 mm. long, 4 mm. wide.

A tree 6 or 7 m. high, with a trunk 15-20 cm. in diameter, covered with thin pale bark separating in small thin flake-like scales, stout spreading smooth pale gray branches forming an open irregular head, and slender slightly zigzag branchlets covered when they first appear with matted white hairs, becoming glabrous or nearly glabrous and reddish brown by the end of their first season and dull gray-brown the following year, and unarmed or armed with an occasional slender straight chestnut brown spine up to at least 4.5 cm. in length.

ARKANSAS. Hempstead County, dry gravelly hills about five miles northwest of Fulton, in open Oak-woods, *C. S. Sargent*, April 23, 1901; *B. F. Bush*, No. 154, April 23, 1901, No. 12, April 17, 1905, Nos. 12, 12A, 12B, March 26, 1909 (in flower); *E. J. Palmer*, No. 8974 (21 A), October 19, 1915, No. 9391 (21 A), No. 16333, September 9 1919, No. 20646, September 26, 1921 (type).

Mr. Palmer, who has watched this tree for several years, suggests that it is a hybrid between *C. apiifolia* Michaux and *C. brachyphylla* Sargent, both of which are growing with it. The bark of the trunk is that of *C. apiifolia* and the fact that a primary vein sometimes extends to the base of a sinus of a leaf, the character by which the *Microcarpae* Group

is best distinguished, also indicates its relationship with *C. apiifolia*. From that species it differs in its larger more pubescent only occasionally lobed leaves often cuneate at base in its more pubescent corymbs of larger flowers with a more pubescent calyx, and in its larger fruit. The pubescence of *C. notha*, although less dense is in character and persistency that of *C. brachyphylla*; the larger rarely lobed leaves, the larger flowers and fruit and the nearly unarmed branches may also be due to the influence of that species. Five individuals are now known, one a solitary tree and the other in a group. They all grow in the immediate vicinity of their supposed parents. If *C. notha* is a hybrid, and there seems to be good reason for the belief, it is a plant of unusual interest, showing as it would the possibility of crossing species of two as distinct groups of the genus as are now recognized. It would be, too, the only hybrid *Crataegus* which has been found in North America.

***Crataegus brachycantha* f. *leucocarpa*, n. forma.**

Differing from the type only in the white or pale straw-colored fruit marked by dark dots.

LOUISIANA. Natchitoches Parish, Natchitoches, *E. J. Palmer*, No. 8719 (12) September 28, 1915 (type).

***Crataegus nuda* (§*Macracanthae*), n. sp.**

Leaves ovate to obovate, acute and often abruptly short-pointed at apex, gradually narrowed and cuneate at base, sharply and often doubly serrate often to below the middle, thin, glabrous, yellow-green above, paler below, 5-8 cm. long, 3-4 cm. wide, with a thin midrib and 6 or 7 pairs of slender primary veins; petioles slender, glabrous, slightly wing-margined, 1-1.5 cm. in length; leaves on vigorous shoots thicker, more coarsely serrate, to 7 or 8 cm. long and 4 cm. wide, with stouter petioles often winged to the base. Flowers appearing in the Arboretum in June (June 7, 1913, June 20, 1917), 1.5 cm. in diameter, on slender glabrous pedicels in wide compact many-flowered corymbs; calyx-tube narrow-obconic, glabrous, the lobes slender, long-acuminate, entire; stamens 10, anthers pale pink, soon white; styles 2. Fruit ripening the end of September, short-oblong to subglobose, bright red, about 1 cm. in diameter, with thin flesh; calyx little enlarged, with a comparatively wide deep cavity pointed in the bottom; nutlets 2, suborbicular, prominently ridged on the back, irregularly penetrated on the inner face by wide irregular depressions, 4 or 5 mm. long and broad, the narrow hypostyle extending to below the middle.

A tree 7 or 8 m. high, with slender nearly straight glabrous red-brown lustrous branchlets, becoming dark gray-brown and armed with numerous nearly straight slender spines 3-4.5 cm. in length.

MISSOURI. Taney County, woods near Swan, *C. S. Sargent*, October 1899 (type); *B. F. Bush*, No. 12A, September 25, 1905, Nos. 12 and 13, April 21 and May 16, 1907; Arnold Arboretum No. 4439 (Seed List 18), June 7 and October 9, 1913, June 20 and September 24, 1917, September 29, 1900, August 1, 1921.



This is the only glabrous species of the *Macracanthae* which has been found in the region west of the Mississippi River. Glabrous species in this group are not common anywhere and of them I have seen only *C. bristolensis* Sargent with ten stamens and rose-colored anthers and *C. Emersoniana* Sargent with ten stamens and yellow anthers, both from Bristol County, Massachusetts, and *C. venustula* Sargent from western New York and Ontario with ten stamens and yellow anthers. The other *Macracanthae* with glabrous corymbs have more or less hairy leaves or calyx-lobes villose on the inner surface.

(To be continued)

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## NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM<sup>2</sup>

ALFRED REHDER

ROSACEAE (continued)

× *Rosa Barbierana*, nom. nov. (*R. multiflora* var. *cathayensis* "Crimson Rambler" × *Wichuraiana*). — *R. Wichuraiana rubra* André in Rev. Hort. 1900, 385; 1901, 20, t.

This handsome climbing Rose was raised by Barbier & fils, Orléans, France, from seeds of *R. Wichuraiana* fertilized by "Crimson Rambler"; it produces in great abundance single carmine flowers 3–4 cm. across.

× *Rosa Paulii*, nom. nov. (*R. arvensis* × *rugosa*). — *R. rugosa repens alba* Paul & Son apud F. in Gard. LIV. 279 (1910). — Darlington in Rose Annual, 1915, 43.

Shrub with long creeping or sarmentose stems densely covered with slender straight prickles and bristles; stem and prickles glabrous. Petioles and rhachis pubescent, sparingly prickly and glandular-bristly; stipules very large, sparingly glandular-ciliate; leaflets 5–7 on flowering branchlets, 7, rarely 9 on shoots, elliptic to obovate, 2–4 cm. long, acute or abruptly acute, coarsely serrate, glabrous, dark green and slightly rugose above, pale green beneath and pubescent on the veins and veinlets; stipules sparingly and minutely denticulate. Flowers white, about 7 cm. across in 5–12-flowered corymbs; peduncles densely prickly; pedicels densely covered with glandular bristles interspersed with a few slender prickles; receptacle glandular-bristly; sepals ovate-lanceolate, long-acuminate, usually entire, stipitate-glandular on the back; petals obovate, emarginate; styles exserted, free, glabrous.

<sup>2</sup> Continued from vol. II, p. 180.

This hybrid was raised by G. Paul & Sons of Cheshunt, England, and first distributed in 1903. It is a very vigorous shrub with large and showy white flowers; its long prostrate stems form in course of time an impenetrable bush to 6 feet high and of great width. The parentage of this Rose is usually given as *R. rugosa* Thunb. and *R. Wichurauana* Crépin, and without doubt it is a hybrid of *R. rugosa* with a trailing species of the Synstylae group, but in the texture of the leaves and their size and serrature and in the slight serration of the stipules it shows much more affinity to *R. arvensis* Huds. (*R. repens* Scop.) than to *R. Wichurauana*; there is no trace of the small coriaceous lustrous leaves and the conspicuously dentate stipules in this hybrid. I, therefore, am inclined to consider the Rose known as *R. rugosa repens alba* a hybrid between *R. rugosa* and *R. arvensis* and it may bear the name of its raiser, George Paul, a name which figures so prominently in the history of the development of garden Roses.

The form with rose-colored flowers of apparently the same parentage may be known as **R. Paulii** f. *rosea*, comb. nov. (*R. rugosa repens rosea* Darlington in *Rose Annual*, 1915, 43).

The similar *R. Jacksonii* Willmott (*R. rugosa* × *Wichuraiana*) may be distinguished by its 7-9 smaller leaflets, lustrous above, less coarsely and almost crenate-serrate, and by the more densely and more deeply glandular-denticulate stipules.

× **Rosa Bruantii** nom. nov. (*R. odorata* [vel *R. dilecta*] × *rugosa*.)

Upright shrub to 2 m.; branchlets glabrous, often slightly bloomy, armed with numerous straight prickles to 8 mm. long, passing into bristles. Leaves 5-7-foliolate; leaflets generally elliptic, 3-5 cm. long and 1.5-3 cm. broad, the terminal one often broadly obovate or ovate and to 3.5 cm. broad, acute or short-acuminate, broadly cuneate or sometimes, particularly the terminal leaflet, nearly rounded at base, rather closely and usually more or less doubly serrate, bright green, glabrous and nearly smooth above, grayish green and pubescent on the veins and veinlets beneath; petioles and rachis villose and armed with few straight or nearly straight unequal prickles; stipules rather narrow, doubly glandular-denticulate, ciliolate, with lanceolate or ovate-lanceolate upright or slightly spreading auricles. Flowers in usually 2-4-flowered corymbs, in the type white, fragrant, nearly double and 7-8 cm. across; pedicels slender, 3-5 cm. long, stipitate-glandular and bristly; ovary subglobose, glabrous; sepals ovate oblong, caudate, entire or sparingly serrulate at the elongated apex, sparingly stipitate glandular on the back, and finely villose toward the margin.

For the type of this hybrid group which is intermediate between *R. rugosa* Thunb. and the Tea Roses or Hybrid Tea Roses, I take "Madame Georges Bruant," raised by Bruant and offered to the trade in 1887, and



said to be a hybrid between *R. rugosa* and the Tea Rose "Sombreuil." The description given above is based on specimens collected June 20, 1921, and preserved in the herbarium of the Arnold Arboretum. Another Rose stated to be of the same origin is "Blanc Double de Coubert" (Cochet-Cochet, 1892). It will be in many cases difficult to draw a line between this group and *R. Arnoldiana* comprising the hybrids of *R. rugosa* and the Hybrid Perpetuals, as the Hybrid Perpetuals and the Hybrid Tea Roses are closely connected by intermediate forms, but it does not seem advisable to merge these two groups under one name. Another related group constitute the hybrids between *R. rugosa* and *R. chinensis*, the type of which is *R. calocarpa* Willmott, a single-flowered and freely fruiting plant.

× *Rosa anemonoides*, nom. nov. (*R. laevigata* × *odorata*).— "Anemomen-Rose" J. C. Schmidt apud Rehder in Möller's Deutsch. Gärtn.-Zeit. xi. 345, fig. (1896). — *Rosa laevigata* "Anémone Rose", Mottet in Rev. Hort. 1901, 549, tab. — *R. sinica* "Anemone" P. in Gard. LXII. 413, fig. (1902). — Gard. LXXVII. 340, fig. (1913); LXXX. 309, fig. (1916). — *R. laevigata* var. "Rose-Anemone" Easlee, Fl. & Sylva, III. 218, fig. (1905). — *Rosa laevigata* × *chinensis* "Rose Anemone" Willmott, Gen. Rosa, 121, tab. (1911).

This hybrid which was raised by I. C. Schmidt of Erfurt, sometime before 1896 from seed of *R. laevigata* Michx. resembles in its general characters its parent and was considered by Mottet only a variety of *R. laevigata*, but its larger pink flowers, the occasional occurrence of 5-foliate leaves, the less bristly receptacle, the exserted styles and particularly the stipules adnate about one half of their length to the petiole show the influence of some other Rose which was to all appearances a Tea or a Hybrid Tea Rose; the somewhat exserted styles, the shape of the stipules and the texture, shape and serration of leaflets indicate the influence of *R. odorata* Sweet.

× *Rosa dilecta*, nom. nov. (*R. odorata* × *borboniana*). — "Hybrid Tea scented Roses" Paul, Rose Garden, ed. 9, 303 (1888). — "Thee Hybrid-Rosen," Schultheiss, Deutsch. Rosenbuch, 147 (1889). — "Tea Hybrids" Barron in Bailey, Cycl. Am. Hort. iv. 1563 (1902). — "Roses Hybrides de Thé" Cochet-Cochet, Rosiers, 166 (1897). — Gravereaux, Ros. l'Hay, 84 (1902). — Hybrid Tea Rose" Pemberton, Rose, 88 (1908).

The forms of this group, the type of which may be considered "La France," are intermediate in their characters between the Tea Rose, *R. odorata* Sweet and the Hybrid Perpetuals which belong to *R. borboniana* Desp. They are slender-branched, sometimes sarmentose shrubs; the stems armed with scattered straight or slightly hooked prickles. The leaves are glabrous and of firm texture, often purplish when unfolding. The flowers are usually solitary or in few-flowered corymbs, white to red, or sometimes yellow, fragrant and when opening are of a distinct conical shape with recurving petals.

As this group of hybrids has not yet received a binomial designation, I propose the name *R. dilecta*, meaning the beloved or highly esteemed, since such universal favorites as "American Beauty" and "La France" belong in this group.

*Rosa Richardii*, nom. nov. — *Rosa sancta* A. Richard, Fl. Abyss. i. 262 (1847), non Andrews.

The name *R. sancta* given by Richard to this Abyssinian Rose is unfortunately antedated by *R. sancta* Andrews, Roses, II. t. 98 (1928) and cannot be retained. The exact systematic position of Andrew's *R. sancta* is not clear; it bears some resemblance to *R. chinensis* var. *minima* Rehd. (*R. Lawrenceana* Sweet), as Miss Willmott (Gen. Rosa II. 338) points out, but the slender infrastipular paired prickles and the stipitate-glandular pedicels suggest relation to the Cinnamomeae.

× *Rosa Waitziana* Tratt. var. *macrantha*, comb. nov. — *R. macrantha* Desportes, Fl. Sarthe, 77 (1838). — Grenier & Godron, Fl. France, I. 553 (1848). — Boreau, Fl. Cent. France, ed. 3, II. 227 (1857). — A. Piper in Gard. LII. 465 t. fig. 1. — Rouy & Camus, Fl. de France, VI. 270 (1900). — Mottet in Rev. Hort. 1901, 548, t. fig. 2. — Willmott, Gen. Rosa, II. 403 (1912). — Bean, Trees, Shrubs Brit. Isls. II. 418 (1914). — *R. gallica* var. *macrantha* Hort. apud Rehder in Bailey, Cycl. Am. Hort. IV. 1552 (1902); Stand. Cycl. Hort. V. 2989 (1916).

This hybrid Rose which is undoubtedly a hybrid between *R. canina* and *R. gallica* and was first described as *Rosa macrantha* must be referred according to the Rules as a variety to *R. Waitziana* Trattinick, not Reichenbach the oldest binomial designation for a hybrid between *R. canina* and *R. gallica*.

*Rosa arnoldiana*, Sargent in Bull. Pop. Inform. Arnold Arb. n. ser. v. 38 (1919) (*R. rugosa* × *borboniana* "Général Jacqueminot"). — Gersdorff in Am. Rose Ann. 1919. 136. — *Rosa* "Arnold" in Am. Rose Ann. 1916, 125. — *Rosa* "Dawson's Hybrid Rugosa" Gersdorff in Am. Rose Ann. 1917, 121.

Shrub with stout upright stems; shoots and flowering branchlets covered with slender prickles and bristles, the prickles gradually passing into short glandtipped bristles and stipitate glands; the young stems sparingly pubescent or nearly glabrous. Leaves 5-7-foliate; leaflets elliptic-ovate or broadly elliptic, 3.5-6 cm. long, short-acuminate or rounded at apex, rounded at base, simply or slightly doubly serrate, dark green and slightly rugose above, grayish green beneath and finely pubescent on the veins and sparingly so on the veinlets; petiole and rachis pubescent and stipitate-glandular and sparingly furnished with small often gland-tipped prickles; stipules broad, sparingly glandular ciliate. Flowers bright amaranth-purple, semi-double about 6 cm. across in few-flowered corymbs; bracts large; pedicels densely stipitate-glandular; sepals ovate-lanceolate, long-acuminate, entire, very rarely with a single



lobe, pubescent and stipitate-glandular on back, reflexed after anthesis, later spreading; receptacle subglobose or broadly pyriform, smooth; petals orbicular-obovate.

Cultivated at the Arnold Arboretum under No. 6582; specimens collected June 21, 1916, and June 12, 1921, (type) are preserved in the herbarium of the Arnold Arboretum.

This hybrid was raised at the Arnold Arboretum by Jackson Dawson in 1914 by fertilizing *R. rugosa* with "Général Jacqueminot." It is a very striking Rose on account of the deep red color of the large flower and has proved perfectly hardy at the Arnold Arboretum.

There seems to be no older available binomial for the hybrids between *R. rugosa* and the different forms of the Hybrid Perpetuals to which "Général Jacqueminot" belongs and which may be classed under *R. borboniana* Desp.,<sup>3</sup> though hybrids of similar origin have been raised by G. G. Paul and others. Thus the name *R. arnoldiana* may stand as the binomial designation for the hybrids between *R. rugosa* and the "Hybrid Perpetuals."

*Rosa virginiana* var. *lamprophylla*, var. nov.

A typo recedit foliolis basi manifeste cuneatis ellipticis vel obovato-ellipticis, rarius obovatis, apice acutis vel interdum rotundatis, glabris, lucidissimis, breviter petiolulatis, foliis turionum 9-foliolatis.

<sup>3</sup> *Rosa borboniana* Desportes, Ros. Gall 106 (1828).—Morren in Ann. Soc. Agric. Bot. Gand II. 11, t. 42 (1846).—Gravereaux, Ros. L'Hay, 27 (1902).—*R. canina* *Burboniana* Thory in Redouté, Roses, III. 105, t. (1824); ed. 3, III. gr. 20, 3, t. (1835).—*R. indica* β. *borbonica* Hort. apud K. Koch, Hort. Dendr. 122 (1853), nomen. - Regel in Act. Hort. Petrop. V. 358 (Tent. Monog. Ros. 74) 1878), syn. nonnull. exclud.—*R. chinensis* β. *borbonica* Dippel, Handb. Laubholz. II. 563 (1893), syn. nonnull. exclud.—*R. Borbonica* Mouillefert, Arb. Arbriss. I. 558 (1893).—Rehder in Bailey, Cycl. Am. Hort. IV. 1551 (1902); Stand. Cycl. Hort. V. 2988 (1916).—Willmott, Gen. Rosa II. 339, t. (1912).—*R. gallica* var. *damascena* Voss, Vilmorin's Blumen-gaert. I. 254 (1894), pro parte.

The typical *R. borboniana* was introduced about 1819 from the Island of Bourbon to France and is considered a hybrid of *R. chinensis* var. *semperflorens* and a form on *R. gallica*. From this cross the hybrid Bourbon Roses and later the Hybrid Perpetuals have been derived which likewise are chiefly hybrids between forms of *R. chinensis* and forms of the Gallicae group. As these groups of hybrids originated from the same species as the original Bourbon Rose or from closely related species and no definite line can be drawn between these groups, it seems best to use *R. borboniana* as the binomial designation for the whole group of hybrids of *R. chinensis* (possibly with some admixture of *R. odorata*) with the species and forms of the Gallicae group.

*Rosa borboniana* Desp. must not be confused with *R. Bourbonia* Roessig (Oek.-bot. Beschreib. Ros. II. 28 [1803].—*R. formosa* Roessig, Ros. no. 50, t. [1804?].—*R. gallica* *Burboniana* Thory in Redouté, Ros. I. 74 [1817]); this is a form of *R. gallica* in Roessig's time much cultivated in France, and judging by Roessig's description and colored plate similar in appearance to *R. borboniana*, but it differs chiefly in the short straight spines of the glandular stem, in the doubly serrate, fragrant, ovate leaflets, in the doubly lobed sepals and the densely red-glandular receptacle. The name *R. Bourbonia* Roessig can hardly be considered a homonym invalidating the later *R. borboniana*, as the spelling and the derivation is different; the name "Bourbonia" being a personal name derived from the house of Bourbon, while "borboniana" is a geographical designation referring to the Island of Bourbon, where the plant originated.

Cultivated at the Arnold Arboretum under No. 1579 (sent from Mt. Desert Island, Maine, in 1881 by Professor R. T. Jackson); specimens collected June 26 and September 29, 1902 (No. 3) and September 16, 1921 (No. 1579, type) preserved in the herbarium of the Arnold Arboretum. The following specimens though not typical, are also referable to this variety: Maine: Mt. Desert Island, Somersville, September 21, 1892, *M. L. Fernald* (a somewhat abnormal form with deeply incised-serrate leaflets); Moore's Harbor, Isle Au Haute, Knox County, August 21, 1913, *A. F. Hill* (No. 1150); South Poland, Androscoggin County, 1895, *Kate Furbish* (partly). (All from the herbarium of the New England Botanical Club). Massachusetts: Jamaica Plain, Well's Farm, July 12, 1902, *A. Rehder*. Connecticut, Southington, Sept. 2, 1902, *C. S. Sargent*.

The living plants of this variety look quite distinct from the typical form of *P. virginiana* on account of its very lustrous, dark green leaves and dense habit; it forms wide dense clumps, with upright stems to 1 m. tall but usually lower, the branches are spreading and often more or less pendant and the outer shorter stems of the clump often procumbent; sometimes all the stems are low and their spreading slender branches procumbent. The leaves of the shoots are usually 9-foliolate, those of the flowering branchlets 7-foliolate or sometimes 9-foliolate; the leaflets are elliptic or narrow-elliptic to elliptic-obovate or obovate, distinctly cuneate at the base, acute or sometimes rounded at the apex, 1.5–3.5 cm. long, sharply serrate with often slightly incurved teeth, glabrous or sometimes slightly pubescent on the midrib beneath; rachis usually with few small prickles and sometimes slightly pubescent. The flowering branchlets are not bristly and sometimes without prickles.

As an ornamental plant it is very handsome on account of its dens rather spreading habit, its dark green leaves, their color in pleasing contrast to the red petioles and branchlets; the large pink flowers and the ornamental red hips in autumn are not different from those of the typical form.

*Rosa carolina* var. *glandulosa*, comb. nov. — *R. serrulata* Rafinesque in Ann. Gén. Sci. Phys. v. 218 (1820). — Rydberg in N. Am. Fl. xxii. 500 (1918). — *R. parviflora* var.  $\beta$ . *glandulosa* Crépin in Bull. Soc. Bot. Belg. xv. 68 (1876). — *R. parviflora* var.  $\delta$  *setigera* Crepin, l. c. (1876), ? in part. — *R. mexicana* S. Watson in Proc. Am. Acad. xvii. 354 (1882), not Willdenow.

SPECIMENS EXAMINED: Pennsylvania: Mountain Park, Luzerne County, July 4, 1907, *A. Twining* (No. 10). District of Columbia: Takoma Park, June 3, 1899, *T. A. Williams*. Virginia: Natural Bridge, Rockbridge County, September 16, 1888, *C. S. Sargent*; near Suffolk, Nansemond County, August 21, 1908, *A. Rehder*. West Virginia: near Durbin, Pocahontas County, August 26, 1907, *A. Rehder*; near White Sulphur Springs, Greenbrier County, August 31, 1907, *A.*



*Rehder*. North Carolina: Buncombe County, October 29, 1906, *T. G. Harbison*. Tennessee: Nashville, Davidson County, October, 1879, *A. Gattinger*; Memphis, Shelby County, May 15, 1920, *E. J. Palmer* (No. 17512). Alabama: Selma, Dallas County, May 5, 1913, *T. G. Harbison* (No. 1099). All in herb. Arnold Arboretum.

This variety differs from the type in its more or less doubly serrate leaflets, their teeth provided at least partly with one or few gland-tipped small teeth or glandular-ciliate, and in its glandular-hispid or stipitate-glandular rachis. I can see no other difference between this variety and the type with which it is closely connected by intermediate forms. Therefore I cannot consider it specifically distinct, as does Rydberg. He lays much stress on the teeth being gland-tipped on *R. serrulata* in which he includes also forms with simply serrate leaflets, and glandless in *R. carolina*, but I find the teeth in *R. serrulata* as well as in *R. virginiana* and *R. carolina* tipped by a callous more or less gland-like mucro, not by a distinct gland; distinct stipitate glands occur only on the minute serratures of the teeth of the leaflets of the var. *glandulosa* and also on the minute teeth at the base of these leaflets. To var. *glandulosa* belongs probably, at least partly, Crepin's *R. parviflora* var. *setigera* with bristly flowering branchlets, though it may be partly referable to *R. subserrulata* of Rydb., which may be likewise only a variety of *R. carolina*.

According to Rydberg *R. serrulata* Raf. is distributed from Massachusetts to Ontario, Iowa, Texas and Florida and extends into Mexico as far as Coahuila and Nueva Leon.

*Rosa Lyonii* Pursh. f. *alba*, comb. nov. — *R. lucida* var. *alba* in Am. Florist, XII, 1098, fig. (1897); in Gardening, v. 306, fig. (1897). — Rehder in Bailey, Cycl. Am. Hort. iv. 1554 (1902); in Möller's Deutsch. Gärtn. - Zeit. XIX. 205, fig. (1904). — *R. virginiana alba* Willmott, Gen. Rosa, I. tab. opp. p. 198 (1911). — Bean, Trees & Shrubs, Brit. Isls. II. 447 (1914), as var. — Rehder in Bailey, Stand. Cycl. Hort. v. 2991 (1916), as var.

This white-flowered form which had been referred to *R. virginiana* Mill. belongs apparently to *R. Lyonii* Nutt., as the petioles, rachis and the under side of the leaves are pubescent, the leaflets are obovate to elliptic or narrow-elliptic, usually obtuse, rarely acute, and dull green above; the prickles are rather small, slender and straight. The form was found at Cherryfield, Maine, about 1867.

*Rosa suffulta* Greene f. *alba*, n. comb. — *R. pratincola* f. *alba* Rehd. in Mitt. Deutsch. Dendr. Ges. XIX. 252 (1910). — *R. arkansoides* f. *alba* Schneider, Ill. Handb. Laubholz. II, 971 (1911). — *R. heliophila* f. *alba* Rehder in Mitt. Deutsch. Dendr. Ges. XXIV (1915), 222 (1916).

A form with white flowers received in 1901 from Professor S. B. Green of the University of Minnesota, St. Anthony Park, Minnesota.

*Rosa californica* Cham. & Schlecht. f. *plena*, nom. nov. — *R. californica* Willmott, Gen. Rosa, i. t. opp. 233 (1911). — *R. californica flore pleno* Bean, Trees & Shrubs, Brit. Isles, i. 421 (1914).

A form with double or semidouble flowers.

*Rosa Penzanceana*, nom. nov. (*R. Eglanteria* × *foetida punicea*). — *R. rubiginosa* × *lutea punicea* (Rose Penzance) Crépin in Jour. des Ros. 1891, 123; in Gard. Chron. ser. 3, ix, 671 (1891). — *R. lutea* × *rubiginosa* Crépin in Bull. Soc. Bot. Belg xxxiii. 124 (1894). — *R. rubiginosa* × *lutea* Keller in Ascherson & Graebner, Syn. Mitteleur. Fl. vi. 348 (1902). — *R. Eglanteria* × *punicea* Willmott, Gen. Ros. ii. 455 (1912).

This hybrid, called the "Lady Penzance Rose," was raised by Lord Penzance about 1894 from a cross between the Sweet Briar and the Austrian Briar. It has the fragrant leaves of *R. Eglanteria* L. and pink flowers suffused with yellow. A full description of this hybrid is given in Miss Willmott's book cited above.

× *Prunus Dunbarii*, hybr. nov. (*P. americana* × *maritima*).

Much-branched shrub or tree to 5 m. tall, with broad spreading head; spreading by suckers; young branchlets pubescent, at maturity nearly glabrous and red-brown, becoming dark brown the second year; winter-buds ovoid, acutish, light brown, puberulous or nearly glabrous. Leaves elliptic-oblong or sometimes oblong-obovate, 4.5–9.5 cm. long and 1.8–5 cm. broad, abruptly acuminate, rounded to cuneate at base, sharply serrate with acuminate teeth, glabrous above except on the midrib or very sparingly hairy, pubescent beneath on the midrib and less densely so or sometimes glabrescent on the veins and veinlets; petioles 0.5–1 cm. long, densely short-pubescent. Flowers 2–4, white, about 1.5 cm. across; pedicels 5–8 mm. long, minutely pubescent toward the apex or nearly glabrous; sepals oblong, obtuse, as long or slightly longer than the tube, entire, finely pubescent outside, villose inside, petals obovate, about 7 mm. long, with a long claw; stamens about as long as petals. Fruit subglobose, purple, slightly bloomy, 1.7–2 cm. across, on slender stalks about 1.5 cm. long; stone broadly ovoid, compressed, sharply keeled on one side, 1.3–1.5 cm. high and 1.2 cm. wide, smooth.

Cultivated in Genesee Valley Park (old Frost Nursery) and Highland Park, Rochester, New York. Specimens in herb. Arnold Arboretum: Genesee Valley Park, April 24, 1921, *B. N. Slavin* and April 25 and August 15, 1921, *J. Dunbar* & *R. E. Morsey*, (Edson No. 0–1154, type); Highland Park, April 25, 1921 and October 9, 1920, *J. Dunbar* & *L. G. Edson* (Edson No. 0–1152). Photograph of the tree in Genesee Valley Park taken by *R. E. Morsey* in the photograph collection of the Arnold Arboretum.

This hybrid originated about 22 years ago from seed of *P. maritima* collected by Mr. John Dunbar in Highland Park. The tree in Genesee Valley Park is now nearly 5 m. tall with a short trunk about 0.3 m. high



and 0.25 m. in diam. and with a spreading round head about 7 m. in diameter. There is no doubt that the other parent of the hybrid is *P. americana* Marsh. which was standing near the parent tree, as it is clearly intermediate between the two. From *P. americana* it differs chiefly in its lower more shrubby habit, in its pubescent branchlets, in its somewhat broader more finely serrate leaves, more or less pubescent beneath, in the shorter pubescent petioles, in the smaller purple fruit and smaller stone. From *P. maritima* Wagh. it may be distinguished by the branchlets being glabrous at maturity, by the larger acuminate more deeply and sharply serrate leaves, glabrous or nearly so above, less densely pubescent beneath, by the glabrescent pedicels and calyx-tube, longer sepals, larger purple fruit and larger more compressed stone. From *P. lanata* Mack. & Bush with which it may be confused on account of the pubescent leaves it can be distinguished by the more finely serrate leaves, shorter petioles, and shorter pedicels on the smaller purple fruit.

The two trees of this hybrid differ considerably in their leaves; the tree in Genesee Valley Park (No. 1154) has somewhat larger and broader more or less ovate leaves rounded at the base, more rugose and with a few scattered hairs above, hairy on the midrib, veins and veinlets beneath; the tree in Highland Park has smaller leaves, often more or less obovate in outline, 8 cm. long and 3.5 cm. wide, broadly cuneate at base, quite glabrous above, beneath only densely hairy on the midrib, glabrous or glabrescent on the veins and veinlets, and shorter petioles not exceeding 8 mm. in length.

As an ornamental, this hybrid plant seems to surpass when in bloom both parents in beauty, judging from the photograph of the tree in Genesee Valley Park.

*Prunus mume* Sieb. & Zucc. var. *tonsa*, var. nov.—*Prunus mume* Koehne in Sargent, Pl. Wilson 1, 278 (1912), non Sieb. & Zucc.

A typo recedit foliis tantum subtus ad costam vel secus costam basin versus villosis et in axillis nervorum inferiorum barbatis ceterum glabris vel fere omnino glabris plerisque angustioribus quam in typo, basi saepe late cuneatis.

CHINA. Western Szechuan: west and near Wen-chuan Hsien, thickets, alt. 1300–2500 m., September, 1908, *E. H. Wilson* (No. 1018). type; alt. 16–2000 m., October, 1910, *E. H. Wilson* (No. 4046). Southern Szechuan: between Kalapa and Linki, alt. 3200 m., May 17, 1914, *C. Schneider* (No. 1285); near Woloho, alt. 2600–2800 m., June 14 and 15, 1914, *C. Schneider* (Nos. 1546, 1574). Western Hupeh: Ichang, wild and cultivated, alt. 300–1000 m., March and September, 1907, *E. H. Wilson* (No. 75). Chekiaug: near Changhua, July 10, 1915, *F. N. Meyer* (No. 1538). Kwangtung vicinity of Canton, December, 1917, and April, 1918, *C. O. Levine* (Nos. 1886 and 2113). Kiangsu: near Nanking, garden of temple in Spirit Valley, June 4, 1915, *F. N. Meyer* (No. 1426).

FORMOSA. Around Musha, prov. Nante, wild, March 4, 1918, *E. H. Wilson* (No. 10010; bush up to 30 ft.).

CULTIVATED. "In the Woods," Chevey Chase, Maryland, June 15, 1920 (Nos. 526 and 521), June 15, 1920 and March 27, 1921 (Nos. 522, 523, 528), *P. F. Newhall*. U. S. Plant Introduction Station, Chico, Calif., January 26 and August 11, 1921 (S. P. I. No. 41061; from Yokohama Nursery Company), February 8 and June 23, 1921 (S. P. I. No. 41455; from Tsaochowfu, Shantung, cultivated by the Chinese for forcing purposes), January 26 and June 8, 1921 (S. P. I. No. 28685; from Yokohama Nursery Company); January 26 and June 23, 1921 (S. P. I. No. 26886; from Dongsi, China), *C. C. Thomas*. Municipal Park, Zaukadoo, Shanghai, April and May, 1917, *L. H. Bailey* (Herb. L. H. Bailey).

Numerous specimens received lately from the Department of Agriculture at Washington from trees cultivated at Mr. David Fairchild's place "In the Woods," Chevey Chase, Maryland, and at Chico, California show at the first glance a marked difference in the pubescence of the leaves; in some the leaves are pubescent on both sides, while in the others they are quite or nearly glabrous except near the base of the midrib beneath and at the same time are generally narrower, inclined to be broad-cuneate at base, and their color is more grayish green as compared with the distinctly yellowish green color of the pubescent form. The latter should be considered the typical form of the species, as Siebold & Zuccarini describe the leaves as "novella utrinque, adulta praesertim subtus pilis rigidis venis impositis pubescenti-scabra et saepius ibidem in inferiore nervi medii parte lana brevi (sicca) fuscescens barbata," though in the diagnosis of the species he says "foliis . . . glabris vel praesertim subtus pubescenti-scabris." In the flowers and in the fruit there is apparently no difference between the two varieties. The glabrous form seems to be widely distributed in China, as appears from the enumeration of specimens above, while of the pubescent form I have seen only one specimen from north Kiangsu, collected by Joseph Hers near Siao Hsien, May 28, 1919 (No. 1046) and two from Honan, collected by L. H. Bailey on Chikungshan, June 14 and 30, 1917. The only Formosan specimen I have seen (*E. H. Wilson*, No. 10010) differs from the Chinese glabrous variety in the narrower more caudately acuminate leaves and may be a different form.

Besides this variety and the type (*Prunus mume*  $\alpha$  *typica* Maximowicz in Bull. Acad. Sci. St. Pétersb. xxix. 84 (1883); in Mém. Biol. xi. 672 (1883).—*P. Myrobalana fl. roseis* Hort. gall. ex Kew Hand-list 1, 133 (1894) several varieties and forms are in cultivation, as *P. mume* var. *albo-plena* Bailey, var. *pendula* Nichols., var. *pleiocarpa* Maxim., var. *Goethartiana* Koehne, var. *bungo* Makino, and *Armeniaca mume* var. *alba* and var. *Alphandi* Carrière. *Armeniaca mume* var. *alba* Carrière may possibly be the same as var. *tonsa* described above, but as Carrière does not say anything about the pubescence or lack of pubescence of this



form, we have to assume that it agrees with the type and represents a form identical with a specimen from a plant cultivated at Chico under the P. O. G. No. 16003 and with several specimens received from "In the Woods" Chevy Chase, Md., under Nos. 520, 524, 531, 532 and 533, which have pubescent leaves and white flowers. I therefore propose to use the name *P. mume* f. *alba*, n. comb. (*Armeniaca mume* var. *alba* Carrière in Rev. Hort. 1885, fig. 102 [p. 564], 566) for this form. For the double-flowered pink form the oldest valid and available varietal name seems to be *P. mume* f. *Alphandii*, n. comb. (*Armeniaca mume* var. *Alphandii* Carrière, l. c. 564, tab.). There seem to be also forms of var. *tonsa* with double pink flowers, as a specimen collected in the Municipal Park, Zaukadoo, Shanghai, by Professor L. H. Bailey on April 1 and May 20, 1917 (Herb. L. H. Bailey) shows. More and complete material, however, of the various forms is needed, before we can attempt their exact classification.

***Prunus kansuensis* (subgen. *Amygdalus*), sp. nov.**

Frutex altus erectus ramis virgatis; gemmae parvae fusco-brunneae perulis ovatis mucronulatis nitidulis glabris albo-ciliolatis; ramuli hornotini graciles, glabri, virides vel purpurascens, annotini brunnei, pallide punctulatis. Folia oblongo-lanceolata vel lanceolata, 7-12 cm. longa et 1.5-3.5 lata, infra medium latissima, longe acuminata, basi cuneata et in petiolum decurrentia, adpresse serrata dentibus obtusiusculis glanduloso-mucronulatis, inferiora minora interdum grossius serrata dentibus plus minusve patentibus, supra laete luteo-viridia, glabra, subtus paullo pallidiora, secus costam basin versus villosa et interdum ad venas sparsissime villosa; nervis in foliis turionum utrinsecus 8-12 subtus elevatis, reticulo nervulorum fere obsoleto; petioli sursum marginati, glabri, in turionibus plerique 5 mm. longi, ei foliorum fasciculorum 3-8 mm. longi, apice eglandulosi, rarius glandulis imperfectis notati. Flores in axillis bini, ex utraque gemma solitarii, subsessilia; calyx purpurascens; sepala anguste ovalia, 4-4.5 mm. longa et 2.5-3 mm. lata, tubum late campanulatum utrinque glabrum paullo superantia, intus glabra, extus laxe languinoso-villosa; petala alba vel albida, ovalia, 1.2-1.4 cm. longa et 7.5-9 mm. lata, apice obtusa, basi late cuneata et in unguiculum brevissimum contracta; stamina 25-30, 0.4-1 cm. longa, longiora petalis circiter triente breviora; antherae late ovalia, circiter 1 mm. longae; stylus ad medium vel ultra longe villosus, ovario incluso 1.4-1.7 cm. longus, petala paullo superantia vel subaequantia. Drupa subglobosa, dense velutina, vix edulis; putamen oblique ellipsoideum v. obovoideo-ellipsoideum, 2 cm. longum et 1.3-1.5 cm. latum, leviter compressum, 1.1-1.4 cm. crassum, utrinque carinatum, apice brevissime apiculatum, basi sulcis satis profundis longitudinalibus sursum curvatis et plus minusve anastomosantibus.

CHINA. Kansu: Kagoba, south of Hsiku, Oct. 3, 1914, *F. N. Meyer* (No. 2142a, seed only); plants raised from this seed cultivated under No. 40004 at the Plant Introduction Station at Chico, Calif. Specimens examined: Chico, February 10, and August 11, 1921, *C. C. Thomas*. Here belong also specimens collected at the same date from plants cultivated under No. 40001 and raised from seeds collected by *F. N. Meyer* at Sianfu, Shensi, where it is cultivated and said to have come from near Tzewu, south of Sianfu.

This new species is most closely related to *Prunus Persica* Stokes which differs chiefly in its more finely serrate leaves (with usually 5-10 teeth to 1 cm.; while in *P. kansuensis* there are usually 3-5 teeth to 1 cm.) more abruptly contracted at base with usually two conspicuous glands at the apex of the petiole, in the pubescent winter-buds, in the shorter style, as long or usually shorter than the longest stamens, and in the usually larger, pitted and deeply grooved stone with narrow and irregular grooves, while in *P. kansuensis* the stone is not pitted and the grooves are wider and shallower and fairly regular and parallel in the lower half of the stone. The color of the flowers of the new Peach is shell-pink according to Meyer, but in the cultivated specimens before me it is white with only a slight trace of pink in the young bud.

*Prunus kansuensis* shows such a close resemblance and affinity to *P. Persica* that I would have referred it as a variety to that species, if it had not been for the long style and the differently sculptured stone which is not at all pitted and which has shallower more regular grooves. In *P. Persica* and the related species the style is always shorter or at most as long as the longest stamens. The stone in *P. Persica*, *P. communis* Arang. and *P. Davidiana* Franch. is deeply pitted and the grooves are deep and narrow and very irregular, while in *P. mira* Koehne it is nearly smooth, in *P. tangutica* Koehne the stone is grooved and not pitted but this and allied species differ markedly in their spiny branches and much smaller leaves. I find, however, the stone of Wilson's No. 611 from Fang Hsien in Hupeh only slightly pitted and that of Schneider's No. 3190 from Lichiang and Yunnan not pitted and very similar to the stone of *P. kansuensis*, but in the leaves they agree with typical *P. Persica* to which they have been referred; more complete material is needed to decide if these forms should remain with *P. Persica*.

As the collector's field notes to the two numbers on which this new species is founded, give much additional information they may be reprinted here from the Inventory of seeds and plants imported by the Office of foreign seed and plant introduction (U. S. Dept. Agric.). No. 42, 50 (1918):

"40001. (No. 2139a. Sianfu, Shensi, China. August 30, 1914) Wild peaches having larger fruits than the ordinary wild ones, said to come from near Tzewu, to the south of Sianfu, but some also probably collected from trees in gardens which were raised from wild seeds. When seen



wild this peach generally assumes a low bush form of spreading habit; when planted in gardens and attended to, it grows into a small tree, reaching a height of 12 to 20 feet, with a smooth trunk of dark mahogany-brown color. The leaves are always much smaller and more slender than in cultivated varieties, while their color is much darker green. They seem to be somewhat less subject to various diseases than the cultivated sorts, and they are most prolific bearers, although the fruit is of very little value, on account of its smallness and lack of flavor. In gardens around Sianfu this wild peach is utilized as a stock for improved varieties. It is also grown as an ornamental; said to be literally covered in spring with multitudes of shell-pink flowers. See also No. 2123a (S. P. I. No. 39428)."

"40004. (No. 2143a. Kagoba (south of Ksiku, Kansu, China, October 3, 1914.) Wild peaches occurring as tall shrubs in loess cliffs at the Tibetan frontier at altitudes of 6,000 to 8,000 feet. Save for some children who eat these wild peaches, they are otherwise considered worthless wild fruit. Local name Yeh t'ao, meaning "wild peach" and Mao t'ao, meaning "hairy peach".

*Prunus mira* Koehne in Sargent, Pl. Wilson. 1. 272 (1912).—Description adde: Flores praecoces, solitarii, subsessiles; calycis tubus rubescens, basi vel interdum ad medium vel ultra perulis latis margine villosis obtectus, late campanulatus, 4.5–5 mm. longus et circiter 5 mm. latus, extus intusque glaber; sepala rubescentia, anguste ovalia, circiter 5 mm. longa et 3 mm. lata, margine albo-villosula excepta utrinque glabra, tubum subaequantia, demum reflexa; petala alba, suborbicularia, 10–13 mm. longa et lata, apice rotundata vel emarginata, basi in unguiculum 1 mm. longum subito contractum; stamina 45–50, inaequalia, 4–8 mm. longa, longiora petalis circiter triente breviora, filamentis glabris, antheris ovalibus flavis 1.5 mm. longis; ovarium dense villosum; stylus cum ovario 9–10 mm. longus, sepala subaequans, staminibus brevior, triente superiore excepto dense villosus.

The flowers of this species were not known when Koehne described it from a specimen collected by Wilson in western Szech'uan under No. 4205. From seed of this number plants have been raised; they, however, did not prove hardy in this Arboretum, but have flowered since in other gardens where plants had been sent from here. In 1917 a small flowering branch was sent by Mr. L. Barron, Garden City, New York, and this year we received through the Department of Agriculture from the Plant Introduction Garden in Chico, Calif., good flowering material on which the description given above is based. It flowered there on March 1st well before the leaves, while the flowering specimens from Garden City was collected on May 15th with the young leaves developing, the single flower was already loosing its petals and borne on a pedicel about 4 mm. long, but I suspect normally the species flowers before the leaf-buds open.

*Prunus dehiscens* Koehne in Sargent Pl. Wilson. I. 271 (1921); III. 432 (1917).—Descriptioni adde: Flores praecoces, solitarii, subsessiles; calycis tubus rubescens basi perulis glabris obtectus, late campanulatus, 4–5 mm. longus et circiter 5 mm. latus, extus glaber, intus sparse papilloso-pilosus pilis in seriebus irregularibus longitudinalibus dispositis; sepala rubescentia, ovalia, 3.5–4 mm. longa et 3 mm. lata, apice rotundata, integra, glaberrima, demum reflexa, tubo paullo breviora; petala alba, obovata, 11–12 mm. longa et 7–8 mm. lata, apice rotundata, basi lata cuneata et vix unguiculata; staminia circiter 30 (30–33 visa), inaequalia, 3–6 mm. longa, petala dimidia aequantia, filamentis glabris, antheris ovalibus 1.25 mm. longis flavis; ovarium dense breviter pilosum; stylus cum ovario 9–11 mm. longus, papilloso-pilosus vel breviter pilosus triente superiore glabro excepto, stamina aequans vel paullo superans.

When this species was described by Koehne only fruiting specimens collected by Wilson in western Szech'uan under No. 4029 were available. From seed of this number plants have been raised at the Arnold Arboretum which flowered in 1916 and 1917. The description given above is based on specimens collected May 2, 1916, and April 28 and May 6, 1917. In this Arboretum *P. dehiscens* survives ordinary winters, but it succumbed to the unusually cold winter of 1919–20; it is now represented here by young grafted plants.

*Prunus dehiscens* is apparently most closely related to *P. tangutica* Koehne. The flowers of the latter species scarcely differ from those of *P. dehiscens* and the same must be said of the fruit, if mature fruits collected by F. N. Meyer near Lan Tsai in southwestern Kansu belong to *P. tangutica*; they are dehiscent like those of *P. dehiscens* and the stones show no perceptible difference in size and sculpturing. The leaves, however, of *P. tangutica* are described as much larger and the petioles as often glandular; I, therefore, hesitate to form an opinion regarding the identity of the two species until I have seen complete material of *P. tangutica*.

*Prunus Persica* f. *duplex*, comb. nov. — *Amygdalus-Persica Persica* 2. *Persica-duplex* Weston, Bot. Univ. I. 7 (1770). — *Amygdalus Persica*  $\delta$  *plena* Aiton, Hort. Kew II. 161 (1789). — *Amygdalus Persica flore pleno* Sweet, Hort. Brit. 133 (1827). — *Persica duplex* Poiteau & Turpin, Traité Arb. Fruit. I. 276, t (1835). — *Amygdalus Persica*  $\beta$ . *multiplax* Bunge in Mém. Sav. Etr. Acad. Sci. St. Pétersb. II. 96 (1838). — *Persica vulgaris* var. 4. *flore pleno* Hort. apud Loudon, Arb. Brit. II. 680 (1838). — *Persica vulgaris* var. *flore pleno roseo* Lavallée, Arb. Segrez. 68 (1877), nomen. — *Prunus Persica* var. *flore pleno* Voss, Vilmorin's Blumengärt. I. 232 (1894). — *Prunus Persica* var. *flore roseo-pleno* Nicholson in Handlist Arb. Kew I. 131 (1894), nomen. — *Amygdalus Persica rosea plena* Zabel in Beissner, Schelle & Zabel, Hand. Laubholz-Ben. 234 (1903).



Weston's varietal name has been adopted here though he wrote "*Persica-duplex*," but as in no other case he used a similar hyphenated name for a variety, I take the repetition of the specific name for a slip of the pen.

This form is an old inhabitant of gardens and according to De-caisne in *Revue Horticole*, 1851, p. 221, where he gives a good colored plate of this form, it was first mentioned in 1636 by Guy de La Brosse in his *Description du Jardin Royal des plantes medicinales*. Bauhin in his *Pinax* published in 1623 does not mention it.

*Prunus Persica* var. *nucipersica* Schneid. f. *aganonucipersica*, comb. nov. — *Persica laevis* var.  $\alpha$  De Candolle, *Fl. Frane.* iv. 487 (1805). — Seringe in De Candolle, *Prodr.* ii. 531 (1825). — *Persica violacea* Risso, *Hist. Nat.* ii. 119 (1826). — Galesio, *Pom. Ital. pl.* (1839). — Roemer *Syn. Monog.* iii. 26 (1847). — *Amygdalus persica* b. *nucipersica*  $\zeta$  *Aganonucipersica* Schübler & Martens, *Fl. Würtemb.* 305 (1834).

This group comprises the freestones of the Nectarine. As in the true Peaches<sup>1</sup> it is uncertain in this variety whether the freestone or the clingstone form represents the type of *P. Persica* var. *nucipersica* (L.) Schneid. and therefore both forms should receive a distinct name.<sup>1</sup>

*Prunus Persica* var. *nucipersica* f. *scleronucipersica*, comb. nov. — *Persica laevis* var.  $\alpha$  De Candolle, *Fl. France*, iv. 487 (1805). — Seringe in De Candolle, *Prodr.* ii. 531 (1825). — *Persica levis* Risso, *Hist. Nat.* ii. 119 (1826). — Roemer, *Syn. Monog.* iii. 27 (1847). — *Amygdalus*

<sup>1</sup> The True Peaches have been divided into the following two forms:

*Prunus Persica* f. *aganopersica* Voss in Puttlitz & Meyer, *Landlex.* vi. 345 (1914). — *Persica domestica* Risso, *Hist. Nat.* ii. 104 (1826). — Roemer, *Syn. Monog.* iii. 23 (1847). — *Amygdalus Persica*  $\alpha$ . *Aganopersica* Reichenbach, *Fl. Germ. Exc.* 647 (1832). — Schübler & Martens, *Fl. Würtemb.* 304 (1834). — *Persica vulgaris*  $\alpha$ . *tomentosa diapyrena* Moris, *Fl. Sard.* ii. 6 (1840). — *Persica vulgaris*  $\alpha$ . *aganopersica* Koch, *Hort. Dend.* 140 (1853). — *Persica vulgaris* 2b *isolata* Kuntze, *Taschenfl.* Leipzig, 273 (1867).

This group comprises the Peaches known as 'Freestones' in which the flesh is easily separable from the stone. As it is not clear which of the two groups of Peaches, the Clingstones or the Freestones, is the type of Linnaeus' *Amygdalus Persica*, it has been necessary in order to distinguish them by definite botanical names to give a name to each of these groups. The oldest varietal name seems to be "*Aganopersica*" which is credited by Voss to Reichenbach, but Schübler & Martens cite Dierbach. As the work of Schübler & Martens was published in 1834, Dierbach's name must have been published earlier, possibly in his "*Systematische Uebersicht der um Heidelberg wildwachsenden . . . Gewächse*" published in 1827, which I have not seen; in Dierbach's *Grundriss der ökon.-techn. Botanik* of 1836 the name appears (p. 160) as group "*Aganopersicae*" of *Persica vulgaris*.

*Prunus Persica* f. *scleropersica* Voss in Puttlitz & Meyer, *Landlex.* vi. 345 (1914). — *Persica vulgaris* Risso, *Hist. Nat.* ii. 94 (1826), Miller pro parte. — Roemer *Syn. Monog.* iii. 23 (1847). — *Persica vulgaris* var.  $\beta$ . De Candolle, *Fl. France*, iv. 487 (1805). — Seringe in De Candolle, *Prodr.* ii. 531 (1825). — *Amygdalus Persica* b. *Scleropersica* s. *Duracina* Reichenbach, *Fl. Germ. Exc.* 647 (1832). — *Amygdalus persica* ii. *Duracina* Dierb. apud Schübler & Martens, *Fl. Würtemb.* 305 (1834). — *Persica vulgaris*  $\alpha$  *tomentosa*\*\* *sympyrena* Moris, *Fl. Sard.* ii. 7 (1840). — *Persica vulgaris*  $\gamma$ . *Scleropersica* s. *duracina* K. Koch, *Hort. Dendr.* 140 (1853).

This group comprises the Peaches known as "Clingstones" in which the flesh firmly adheres to the stone. The name "*scleropersica*" like that of "*aganopersica*" seems to have originated with Dierbach; see remarks under the preceding form.

*persica* b. *nucipersica* η *scleronucipersica* Schübler & Martens, Fl. Würtemb. 305 (1834). — *Persica vulgaris* β *levis violacea* Moris, Fl. Sard. II. 7 (1840).

This group comprises the clingstone Nectarines.

***Prunus amygdalo-persica***, comb. nov. (*P. communis* × *Persica*). — *Amygdalus Amygdalo-Persica* Weston, Bot. Univ. I. 7 (1770). — *Amygdalo-Persica* Duhamel ex Poirét in Nouv. Duh. IV. 112 (1809), pro synonym.<sup>1</sup> *Amygdalus hybrida* Schmidt, Oesterr. Baumz. IV. 27, t. 207 (1822). — Dierbach, Syst. Uebers. Heidelberg Gew. 129 (1827), ex K. Koch, Hort. Dendr. 139; Grundr. Oekon.-tech. Bot. I. 157 (1836). — Poiteau & Turpin, Traité Arb. Fruit. I. 133; t. (1835). — *Amygdalus communis* var. *e persicoides* Seringe in De Candolle, Prodr. II. 531 (1825). — ? *Amygdalus communis persica* Risso, Hist. Nat. 327 (1826). — *Amygdalus Persico-amygdala* Reichenbach, Fl. Germ. Exc. 647 (1832). — Spach, Hist. Vég. I. 381 (1834). — Roemer, Syn. Monog. III. 10 (1847). — *Amygdalus communis* δ ? *amygdalo-persica*? Spach in Ann. Sci. Nat. sér. 2, XIX. 115 (1843). — *Amygdalus communi-Persica* Klotzsch in Bonplandia, VI. 355 (1858). — *Amygdalus hortensis* Dochnahl, Sich. Führer Obstk. IV. 5 (1860). — *Prunus communis* δ *amygdalo-persica* Arcangeli Comp. Fl. Ital. 209 (1882). — *Prunus Amygdalus* δ *persicoides* Koehne, Deutsch. Dendr. 315 (1893). — *Amygdalus persicoides* Decaisne apud Mouillefert, Arb. Arbriss. atl. t. 20 (1895).<sup>2</sup> — Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 234 (1903). — *Prunus persicoides* Vilmorin & Bois, Frut. Vilm. 61 (1904). — Ascherson & Graebner, Syn. Mitteleur. Fl. VI. 2, 139 (1906). — *Prunus persico-amygdala* Schneider, Ill. Handb. Laubho. I. 593 (1906). — *Prunus Amygdalus* var. *praecox* Bean, Trees & Shrubs Gt. Brit. II. 228 (1914).

Though Weston gives no description of his *Amygdalus Amygdalo-Persica* it is clear that his name must be based on Duhamel's name "*Amygdalo-Persica*" published two years earlier. If Weston's name should be rejected for the reason that it lacks a description, Schneider's *P. persico-amygdala* based on *Amygdalus Persico-amygdala* Reichenb. would be the

<sup>1</sup> Poirét cites Duhamel's name as one of the varieties of *Amygdalus communis* without making a varietal combination. Duhamel's name must be considered pre-Linnean, as are the following: *Amygdalopersicus* Camerarius, Hort. Med. Philos. 14 (1588). — *Persica amygdaloides* Bauhin, Pinax, 440 (1623). — *Amygdalo-persica* Duhamel, Arb. Fruit. I. 127, t. 4 (1768). — Under the name "*Amandier-Pecher*" it has been figured by Noisette, Jard. Fruit. t. 3, fig. 1 (1821) and by Jaume St. Hilaire, Fl. & Pom. t. 368 (1830?), and as "*Peach-almond hybrid*" by Leonard Coates in Jour. Hered. XII. 327-328 (habit of tree and fruits) (1922.)

<sup>2</sup> Reichenbach quotes Dalechamp as author of this combination but I have not been able to find that name in the *Historia generalis plantarum* of that author, only "*Persica Amygdala*" occurs there of which I am not sure if it belongs here.

<sup>3</sup> Mouillefert cites "*Amygdalus persicoides* Nouv. Duham." in the text (p. 391) as a variety of *A. communis* without, however, using a varietal combination; on the plate the name appears as "*A. persicoides* Decne". — In Index Kewensis C. Koch is cited as the author of this combination, but he only quotes "*Persicoides* Ser." as one of the synonyms of the "*Mandelpfirsich* oder *Pfirsichmandel*" which he refers to *Amygdalus Persica* as a form.



correct name, for Schmidt's *A. hybrida* though the next oldest name and accompanied by a good colored plate, cannot be transferred to *Prunus* on account of *Prunus hybrida Quetierii* Carr. apud Mouillefert, Arb. Arbriss I. 401 (1895), a supposed hybrid between *Prunus Armeniaca* L. and *P. Persica* Batsch.

*Prunus amygdalo-persica* is very handsome on account of its large and showy pinkish flowers; it has proved perfectly hardy at the Arnold Arboretum and flowers profusely almost every year, while the forms of *P. communis* Arcang. are not hardy in this Arboretum.

*Prunus argentea*, comb. nov.—*Amygdalus orientalis* Miller, Gard. Dict. ed. 8 (*Amygdalus* No. 3) (1759). — *Amygdalus argentea* Lamarck Encycl. Méth. I. 103 (1783). — *Prunus orientalis* Koehne, Dendr. 315 (1893), not Walpers.

As Koehne's combination is preoccupied by *P. orientalis* Walpers (Rep. II. 911 [1843]) based on *Cerasus orientalis* Spach (in Ann. Sci. Nat. sér. 2, XIX. 128 [1843]), the *Amygdalus orientalis* Mill. if referred to the genus *Prunus* must receive another specific name and for this its later synonym *A. argentea* is available. In the Index Kewensis *Prunus orientalis* Walpers is referred as a synonym to *P. microcarpa* C. A. Mey., but the descriptions of the two species differ in some important characters, they are from different localities and Boissier refers *C. orientalis* Spach only "ex parte" to *P. microcarpa* C. A. Mey. Specimens of *P. microcarpa* from the Caucasus collected by F. N. Meyer certainly do not agree with Spach's description of his *Cerasus orientalis*.

*Prunus glandulosa* f. *sinensis* Koehne in Sargent Pl. Wilson. I. 265 (1912). — Add to the synonyms: *Amygdalus pumila* Linnaeus, Mant. 74 (1767). — Sims in Bot. Mag. XLVII. t. 2176 (1820). — *Cerasus japonica*  $\beta$  *multiplex* Seringe in De Candolle, Prodr. II. 539 (1825), pro parte. — *Cerasus chinensis* G. Don, Gen. Syst. II. 514 (1832). — *Cerasus japonica* 2. *multiplex* Loudon, Arb. Brit. II. 706, fig. 415, 416 (1838). — *Prunus chinensis* D. Dietrich, Syn. Pl. III. 44 (1843).

There are two older varietal names which are partly applicable to this form, but both being doubtful, it seems best to retain the name proposed by Koehne. The oldest of these varietal names is *Amygdalus nana duplex* Weston, Bot. Univ. I. 7 (1770). Its English name is given as "Double flowering dwarf Almond" which is without doubt the pink double-flowered form of *P. glandulosa* well known in gardens at that time, but as the Latin name is proposed as a variety distinguished from it only by the phrase "flore incarnato pleno," of *Amygdalus nana* which is according to the description *A. nana* L., an entirely different plant, it does not seem advisable to accept the name on the strength only of the English name cited and for the reason that no double-flowered form of *A. nana* L. is known. The second varietal name is *Cerasus japonica*  $\beta$ . *multiplex* Seringe in De Candolle, Prodr. II. 539 (1825). This belongs as regards the

citations of Linnaeus and Sims and the statement "frequens in hortis culta" to the form in question, but Seringe says "excl. syn. Plukenet" though Plukenet's figure undoubtedly belongs to this form; as to the citation of Ker Seringe's name refers to *P. japonica* var. *Kerii* Koehne. Thus it seems that Seringe's name is chiefly based on the plant here called *P. glandulosa* f. *sinensis*, but the fact that Seringe published it as a form of *Cerasus japonica* makes its application doubtful and it therefore seems wise to abandon this name and retain Koehne's names for the two forms. I can not, however, agree with Koehne in referring *Cerasus japonica*  $\beta$  *multiplex* Seringe, though only "pro parte," to *P. glandulosa* f. *albiplena* Koehne; as pointed out, it belongs partly to *P. glandulosa* f. *sinensis* and partly to *P. japonica* var. *Kerii*.

The origin and time of introduction of this form is uncertain; it was apparently introduced into cultivation about the middle of the 17th century, for in 1687 Hermann (Hort. Acad. Lugd.-Bot. Cat. 487, 489), states that he found it frequently cultivated in English gardens, and introduced it from there into Belgium; he further states that he had seen it growing luxuriantly at the Cape of Good Hope, but the latter statement is apparently an error of memory. He describes it and figures it under the name "*Persica malus Africana nana flore incarnato pleno*." A better figure is given 13 years later by Plukenet (Phytogr. t. 11, fig. 4) and on the same plate as fig. 4 a good illustration of *P. nana* Focke under the name "*Amygdalus Indica nana*" appears, which was frequently cultivated in Belgium about 1687 according to Hermann. The "*Persica malus Africana nana flore incarnato simplici*" mentioned by Hermann without further description is probably the typical form raised from seed of the double form, for in the description of the latter he says "flores . . . aliquando simplici petalorum serie referti."

*Prunus japonica* var. *Kerii* Koehne in Sargent Pl. Wilson. I. 267 (1912).— Add the following synonyms: *Cerasus japonica*  $\beta$ . *multiplex* Seringe in De Candolle, Prodr. II. 539 (1825), pro parte. — *Cerasus japonica* var. *multiplex* G. Don, Gen. Syst. II. 514 (1832). — *Cerasus sinensis* Loudon, Arb. Brit. II. 706, fig. 417 (1838) — *Prunus japonica*  $\beta$ . *multiplex* D. Dietrich, Syn. Pl. III. 44 (1843). — Transfer *Amygdalus pumila* Sims to *P. glandulosa* f. *sinensis*.

This form is apparently not now in cultivation; it was introduced according to Ker about 1808 by Charles Greville from China to England and about 1815 was growing in the nursery of Lee and Kennedy in Hammersmith under the name *P. japonica*. The drawing of *Amygdalus pumila* Sims in Botanical Magazine referred by Koehne to this form, but belonging as I am convinced to *P. glandulosa* f. *sinensis*, was made from a plant received from the same nursery, where it had been already in cultivation about 1774 according to a specimen in the Banksian Herbarium, as stated by Sims. Loudon states that both forms were still growing in the Hammersmith nursery about 1838.



***Prunus japonica* var. *fukienensis*, var. nov.**

A typo recedit ramulis junioribus dense minute pilosulis, foliis subtus ad costa venasque sat dense interdum ad venulas sparsius hirtopilosis, pedicellis et calycis tubo breviter pilosis, sepalis latioribus extus pubescentibus intus puberulis, stylo basi piloso. — Ramuli graciles, tenues; folia elliptico-ovata, 2.5–4 cm. longa, subito caudato-acuminata, basi rotundata, breviter duplicato-serrata, supra breviter scabropilosula; petioli pilosuli, 1–3 mm. longi; stipulae lineares, ad 6 mm. longi, interdum extus pinnatifidae, longe glanduloso-ciliatae; pedicelli circiter 1 cm. longi; sepala ovalia, glanduloso-serrulata, circiter 4 mm. longa; flores deflorati tantum visi.

FOKIEN: Without precise locality, April to June, 1905, *P. T. Dunn* (Hongkong Herb. No. 2654, type, 2662).

This new variety is nearest to *P. japonica* var. *Nakaii*, but differs in its pubescent branchlets, the smaller less deeply and less doubly serrate leaves, their shorter and broader acumen and the rounded base of the leaf. It also shows some relation to *P. japonica Oldhamii* Koehne, with which it agrees in the serration and shape of the leaves though they are smaller and comparatively broader in var. *fukienensis*, but differs in its pubescence which in *P. japonica Oldhamii* is present only on the midrib and usually also on the veins beneath, though occasionally the very young branchlets may be minutely puberulous and the sepals puberulous on the inner surface. This variety seems also to be related to *P. carcharias* Koehne of which I have seen no specimens, but the branchlets of that species are described as densely hirsute with yellowish hairs, the stipules are trifid and up to 12 mm. long and the leaves are much larger, densely accumbent-pilose beneath and more loosely so above.

***Prunus japonica* var. *Nakaii*, comb. nov.** — *P. Nakaii* Léveillé in Fedde, Rep. Nov. Sp. VII. 198 (1909). — Koehne in Sargent, Pl. Wilson. I. 267 (1912). — Nakai, Fl. Sylv. Kor. v. 36, t. 22 (1916).

KOREA: Ouen-san, in lacunis montium, July, 1906, *U. Faurie* (No. 334, type). Prov. Heian: in collibus Chinnampo, June, 1901, *U. Faurie* (No. 77); Taijudo, French Mine, road-sides, common, alt. 400 m., June 18, 1917, *E. H. Wilson* (no. 8636). Prov. Keiki: Koryo, 30 miles northeast of Kaijyo, road-sides, common, July 8, 1917, *E. H. Wilson* (No. 8748); Mountains behind Kaijyo, road-sides, August 20, 1918, *E. H. Wilson* (No. 10596). Prov. N. Kaisho: Hoko, May 29, 1917, *E. H. Wilson* (No. 8493).

I am unable to separate *P. Nakaii* Lév. from *P. japonica* Thunb. as a species; in habit, general appearance, flower, fruit and leaf it differs little from typical *P. japonica* except in the pubescence of the different parts. The leaves of *P. Nakaii* are usually rather densely pubescent beneath and less densely so or nearly glabrous above, the pedicels and calyx-lobes vary from short-pilose to glabrous and the sepals are puberulous on the inner surface, but in Wilson's No. 10596 the leaves are much

less pubescent though the fruiting pedicels, at least on some specimens, show traces of pubescence, otherwise the specimens of this number differ little from *P. japonica Engleri* Koehne which is known from Manchuria. In Wilson's No. 8748 and Faurie's No. 77 the fruiting pedicels show no trace of pubescence, though the leaves beneath are pilose all over in Faurie's specimen and densely so on the veins in Wilson's specimen.

*Prunus japonica* var. *Nakaii* is growing at the Arnold Arboretum where it was raised from seed of Wilson's No. 10596 sown in December, 1918, and germinating in April 1920; it has not yet flowered here.

*Prunus triloba* Lindl. f. *normalis*, nom. nov. — *Prunus triloba* Stapf in Bot. Mag. CXXXII. t. 8061 (1906).

A typo recedit floribus normalibus simplicibus.

The nomenclatorial type of *P. triloba* is the double flowered form introduced in 1855 by Fortune from China into England and first described by Lindley in 1857. This form is known as *P. triloba plena* Dipp. and the form with single flowers is usually called the type. From the nomenclatorial point of view, however, the case should be just reversed and it seems therefore advisable to give to the phylogenetic type a distinct name, for which I propose f. *normalis*. The single-flowered form was apparently first introduced into cultivation by Dr. Bretschneider who sent seeds in 1883 and 1884 from Peking to the Arnold Arboretum; the plants raised from this seed flowered for the first time in 1888.

*Prunus Cerasus* f. *plena* Linnaeus, Spec. i. 474 (1753), as var. — *Prunus Cerasus Cerasus* 4. *plena* Weston, Bot. Univ. i. 224 (1770). — *Cerasus caproniana* ̢. *multiplex* Seringe in De Candolle, Prodr. ii. 537 (1825). — *Prunus Cerasus* ̢. *flore pleno* Sweet, Hort. Brit. 134 (1827). — *Cerasus vulgaris* 3. *flore pleno* Hort. apud Loudon, Arb. Birt. ii. 694 (1838). — *Cerasus austera* ̢. *multiplex* Roemer, Syn. Monog. iii. 75 (1847). — *Cerasus acida* 3. *flore pleno* Kirchner in Petzold & Kirchner, Arb. Musc. 252 (1864). — *P. Cerasus flore albo pleno* Hartwig, Ill. Gehölzb. 287 (1892). — *Prunus Cerasus* f. *semitplena* Schneider Ill. Handb. Laubholz. 616 (1906). — Voss in Putlitz & Meyer Landlex vi. 347 (1912), as subsp. *vulgaris* forma.

The varietal name given by Linnaeus to the double-flowered form of *P. Cerasus* seems to have been neglected by almost all later authors, but as he quotes "*Cerasus hortensis flore pleno* Bauh. pin. 450," the name cannot be intended for any other form than that well known since the 16th century and figured by several pre-linnean writers under various names.<sup>8</sup> Its flowers are not perfectly double, but have a smaller or

<sup>8</sup> *Cerasus vulgaris dupliciflora* Lobel, Icon. ii. t. 172 (1581). — *Cerasus multiflora*, Tabernaemontanus, Kräuterb. 693, fig. (1588). — *Cerasus multiflora* ii. Tabernaemontanus, l. c. 694, fig. (1588). — *Cerasus flore pleno* Besler, Hort. Eystet. i. fol. 4, fig. 1 (1613). — *Cerasus hortensis flore pleno* Miller, Fig. Pl. i. 59, t. 89 (1760). — "Cérissier à fleur semidouble" Duhamel, Arb. Fruit. i. 173, t. 5 (1768). — Loiseleur in Nouv. Duh. v. 19 (1812).



greater number of stamens with fertile anthers and usually normal ovaries; they therefore occasionally produce fruits. The form with perfectly double flowers without stamens and a rudimentary ovary changed into two leafy carpels was first described by Loiseleur (in Nouv. Duh. v. 20 1912) as "*Cérissier à fleur double*" and is apparently the form now called *P. Cerasus* f. *Rhexii* Voss.<sup>1</sup>

The double-flowered form of *P. avium* L. seems to have been unknown to Linnaeus, but the *Prunus-Cerasus sylvestris plena* mentioned by Weston in 1770 can hardly be any other than this form which according to Loiseleur (in Nouv. Duhamel, v. 11) is the *Cerasus major ac sylvestris multipliciflora* of Tournefort (Inst. 627) and the *Cerasus major sylvestris flore pleno* of Duhamel (Arb. Fruit I. 157). It apparently originated in France some time before 1700, but seems to have been little known outside of France before the beginning of the 19th century. Its correct name, therefore, is *P. avium* f. *plena* Schneider (Ill. Handb. Laubholz. I. 616 [1906]).

*Prunus mahaleb* f. *xanthocarpa*, comb. nov. — *Cerasus Mahaleb* 2. *fructu flavo* Hort. apud Loudon, Arb. Brit. II. 707 (1838). — *Cerasus Mahaleb* α. *xanthocarpa* Roemer, Syn. Monog. III. 80 (1847).<sup>2</sup> — *Prunus Mahaleb* var. *fructu luteo* Jaeger, Ziergeh. 398 (1865). — ? *Cerasus Mahaleb* var. *fructu albo* Lavallée, Arb. Segrez. 75 (1877), nomen. — ? *Prunus mahaleb* var. *fructu albo* Mouillefert, Arb. Arbriss. I. 449 (1892). — *Prunus Mahaleb* var. *chrysocarpa* Nicholson in Kew Handlist Arb. I. 143 (1894), nomen. — Gard. LXII. 181, fig. (1902), nomen. — Schneider, Handb. Laubh. I. 617 (1907), as forma.

This form with yellow fruit I find first mentioned in 1812 by Loiseleur (in Nouv. Duhamel v. 7) and it must have been well known at that time, as he says that the variety with yellow fruit is more widely distributed in gardens than the variety with large leaves. The form enumerated as "*fructu albo*" by Lavallée and by Mouillefert is unknown to me, but probably it does not differ much from the form with yellow fruit.

<sup>1</sup> *P. Cerasus* f. *Rhexii* Voss, Vilmorin's Blumengärt. I. 233 (1894). — Bailey, Cycl. Am. Hort. III. 1454 (1901), as var. — ? *Cerasus acida* γ. *plena* Roemer, Syn. Monog. III. 65 (1847). — *Cerasus acida* 5. *Rhexii* Kirchner in Petzold & Kirchner, Arb. Musc. 252 (1864). — *Cerasus avium* fl. pl. serotino Booth's Cat. ex Kirchner, l. c. (1864), as synonym. — *Cerasus Rhexii* Hort. ex Kirchner, l. c. (1864), as synonym. — *Prunus Cerasus* var. *Rhenii*[sic] Jaeger, Ziergeh. 394 (1865). — *Cerasus caproniana ranunculiflora* Vanhoutte, Fl. des Serres XVII. t. 1805 (1868). — *Cerasus vulgaris Rhexii* Hartwig & Ruempler, Bäum. & Sträuch. 145 (1875). — *Prunus Cerasus Rhexii plena*, Jaeger & Beissner, Ziergeh. ed. 2, 266 (1884). — *P. Cerasus caproniana ranunculifera*, Jaeger & Beissner, l. c. (1884). — *P. Cerasus Rhexii flore pleno* Wittmack in Deutsch. Garten-Zeit. 224, fig. (1886). — D. in Garden LXXXVIII. 227 fig. (1914). — Wayland in Gard. LXXXI. 184, (1917). — E. W. S. in Garden LXXXIII. 94, fig. (1919). *P. Cerasus flore albo pleno Rhexii*. Hartwig, Ill. Gehölz. 287 (1892). — *P. Cerasus* f. *ranunculiflora* Voss, Vilmorin's Blumengärt. I. 33 (1894). — *Prunus caproniana serotina flore pleno* Zabel in Biessner, Schelle & Zabel, Handb. Laubholz-Ben. 240 (1903). — *P. Cerasus* subsp. *vulgaris* f. *plena* Lois. apud Voss in Putlitz & Meyer, Landlex. VI. 347 (1914), excl. *synom.*

<sup>2</sup> Roemer quotes a synonym "*var. hortensis* Spach" but Spach (Hist. Veget. I. 409, 1834) does not give a varietal name to this form, he only mentions it in the description "*Drupe noir* (jaune dans une variété de jardin)."

## LEGUMINOSAE

*Sophora japonica* var. *vestita*, var. nov.

A typo recedit foliis supra laxe breviter accumbenti-pubescentibus, subtus molliter dense subaccumbenti-villosis, petiolis rhachibusque, inflorescentia, ramulis dense breviter villosis, tomento in ramulis ad secundum annum persistente.

CHINA. Hupeh, north and south of Ichang, alt. 1-3000 ft., July 1907, *E. H. Wilson* (No. 651, partly, type); Hsing-shan Hsien, open country, alt. 1-3000 ft., October 1907, *E. H. Wilson* (No. 651 partly).

This variety with its velutinous branchlets, inflorescence and petioles and the soft-pubescent under side of the leaflets appears quite distinct from the typical form which has glabrous or glabrescent branchlets, inflorescence and petioles and the under side of the leaves furnished with a strigillose pubescence so closely appressed as to be almost imperceptible to the naked eye, although in all other characters it agrees with the type.

This variety seems to occur only in western Hupeh, while the following variety which may be considered intermediate between this variety and the typical form, has a much wider distribution.

*Sophora japonica* γ *pubescens* Bosse, Vollst. Handb. Blumengärt. ed. 2, III. 408 (1842).—Lavallée, Arb. Segrez. Enum. 54 (1877)<sup>1</sup>.—*S. pubescens* Tausch in Flora, xvii. 489 (1834).—*Styphnolobium japonicum pubescens* Hort. apud Kirchner in Petzold & Kirchner, Arb. Musc. 366 (1864).—*S. japonica* var. *tomentosa* Hort. apud Dieck, Haupt-Kat. Zöschchen, Nachtr. i. 26 (1887), nomen.—*S. Korolkowii* Dieck apud Koehne, Dendr. 323 (1893), in nota.—Cornu in litt. apud Dippel, Handb. Laubholz. ii. 662 (1893).—*S. violacea* Dippel, Handb. Laubholz. ii. 663 (1893), pro parte.—*S. tomentosa* hort. apud Dippel, l. c. 663 (1893).—*S. sinensis* Hort. apud Rehder in Möller's Deutsch. Gärt.-Zeit. xiii. 184 (1898).—*S. japonica* [f.] *chinensis* Hort. apud Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 256 (1903), nomen.—*S. chinensis* Hort. ex Zabel, l. c. (1903), pro synonym.—*S. japonica tomentosa* Hort. apud Zabel, l. c. (1903).—*S. japonica* [f.] *Korolkowii* hort. apud Zabel, l. c. (1903).—A. Henry in Elwes & Henry, Trees Gr. Brit. Irel. i. 38 (1906), as var.

This variety which differs from the type in the soft-pubescent under-side of the leaflets, was first noticed in 1834 by Tausch. He distinguished it as a species with "foliis subtus pubescentibus" from *S. japonica* which he describes as: "foliis . . . subtus glaucis glabris," which is, however, not quite correct as the underside is not glabrous, although it appears so to the naked eye, while in the form in question the villous but slightly appressed pubescence is easily discernible by the eye as well as by the touch. In addition to the character of the pubescence Tausch makes

<sup>1</sup> Lavallée bases the variety on *S. pubescens* Tausch, but Bosse gives no author citation; he only describes it as a variety with hairy leaves and states that the plant is for sale in Flottbeck. Probably the name of this variety will also be found in one of the catalogues of J. Booth's nursery prior to 1842.

out distinctions between his two species in regard to the shape of the calyx and to the color of the petals, but these do not seem to me of any value. The different forms introduced later under various names, as cited in the synonymy above, seem to be referable to this variety; they have the under side of the leaflets soft-pubescent, though their shape differs somewhat in the different forms. There is little or no difference between *S. Korolkowii* and *S. sinensis* as cultivated in this Arboretum; both have oblong-ovate to oblong-lanceolate leaves, rounded to truncate or even subcordate at the base and the keel and wings of the flowers have a slight purplish tinge toward the margin and purple claws, while *S. tomentosa* of which I have not seen flowers, has according to a specimen from a young plant shorter and broader leaves, broad-cuneate to rounded at the base. The shape of the leaves, however, may vary with age, as a specimen from a young plant of *S. Korolkowii* which I collected about 25 years ago in Spaeth's nursery has broad-cuneate leaflets, while our mature trees received from the same nursery have the leaflets rounded or truncate at the base.

Of the origin of these different forms nothing definite is known. *Sophora Korolkowii* came according to Koehne, Henry and Bean from the Arboretum at Segrez, France; judging from its name the plant may have been introduced by Korolkov who sent seeds to Lavallee from Turkestan before 1880, but *S. japonica* is not known in Turkestan. The author citation "Cornu" may be explained by the fact that seeds had been distributed by the Jardin des Plantes of which Cornu was director at that time. *Sophora sinensis* also came into gardens by the way of France, at least on a specimen I collected at Spaeth's nursery about 25 years ago I had noted that the plant was received from Croux, a nursery firm near Paris. Of the origin of *S. tomentosa* I know nothing beyond the fact it was advertised by Dieck in 1887. Of the two Mongolian forms introduced by Dieck, one of which according to Koehne agrees with *S. Korolkowii*, I have not seen specimens.

The following specimens of wild plants I refer to this variety:

CHINA. Hupeh, Patung Hsien, alt. 1-3000 ft., July, August and September 1907, *E. H. Wilson* (No. 651). Szech'uan, Chentu Plain, alt. 1-2000 ft., July 1908, *E. H. Wilson* (No. 2557).

KOREA. Keiki province, Kongo, 30 miles northeast of Keijyo, July 8, 1917, *E. H. Wilson* (No. 8741 "hairy and glabrescent form, truly wild").

In these specimens the leaflets are broad-cuneate to nearly rounded at base, but not truncate as in the form cultivated as *S. Korolkowii*. In the specimen from Szech'uan the pubescence is more villose and distinctly yellowish along the midrib.

*Sophora japonica* var. *violacea* Carrière (in Rev. Hort. 1865, 465), which had been confused by Dippel with *S. chinensis* or *sinensis* hort., a synonym of the preceding variety, is nearer to typical *S. japonica* in the pubescence of its leaves, but the wings and the keel of the flowers are stained with light purple and the flowers appear very late in autumn.



According to Mr. Joseph Hers, secretary of the Lunghai Railroad, to whom we are indebted for much valuable herbarium material from the provinces of Honan and Chihli, the Chinese distinguish three varieties of *Sophora japonica* differing in the color of the wood. In a letter dated December 20, 1919, Mr. Hers gives the following information:

"Three forms of *Sophora* are known in Honan, as well as in Chihli: the pai-kuai, or white *Sophora*; the tow-tsing kuai, or bean-green *Sophora*; the hei-kuai, or black *Sophora*.

"The white form gives the best wood; a 'liao' of white *Sophora* being worth \$7 or \$8, while a liao of green costs only \$6, and a liao of black not more than \$4 or \$5; the liao is the Peking unit for the timber trade and represents a log of one foot in diameter, and 7 feet in length.

"Around Peking the black *Sophora* is not very common; the natives say that it never reaches a great age and as the wood is not of much value, they never plant it. All the very large and old specimens, for instance those of the Temple of Heaven, are said to be 'white.' In Honan, the black form is more common.

"The main difference lies in the colour (and quality) of the wood, which is either pure white, or greenish white, or blackish, and in the bark. The bark of the black *Sophora* is deeply corrugated and of a darker colour, while that of the white is much paler and smoother.

"The difference in the bark of the white and green forms is not very apparent, but the difference between black and white is so striking that no Chinese, of the carpenters or peasants class, will ever hesitate a minute in saying: this is a black and this is a white *Sophora*.

"The Chinese say that there is no difference in the leaves or flowers of the three forms; the leaves of the black form seem however to be shorter, of a darker green above and smooth beneath."

*Genista tenera* O. Kuntze, Rev. Gen. i. 190 (1891).—*Cytisus tener* Jacquin, Icon. Pl. Rar. i. 15, t. 147 (1786?); Coll. i. 40 (1786).—Linnaeus, Syst. Nat. ed. 13 aucta, ii. pt. 2, 1115 (1791).—*Spartium virgatum* Aiton, Hort. Kew. iii. 11 (1789).—*Genista gracilis* Poiret in Lamarck, Enc. Méth. Suppl. II 715 (1811).—*Genista virgata* Link, Enum. Hort. Berol. ii. 223 (1822).—De Candolle, Prodr. ii. 149 (1825).

There can be no doubt that *Genista tenera* is the correct name of the species generally known as *G. virgata* Link, as *Cytisus tener* Jacquin is the oldest name for it; Jacquin's name is cited by Aiton as a synonym of his *Spartium virgatum* and both these names are cited as synonyms of *Genista gracilis* by Poiret.

*Genista januensis* Viviani, Elench. Pl. Hort. Dinegro, 19 (1802).—*Genista triangularis* Willdenow Sp. Pl. iii. pt. 2, 939 (1803).—*Genista scariosa* Viviani in Ann. Bot. i. pt. 2, 175 (1804).—*Genista triquetra* Waldstein & Kitaibel, Pl. Rar. Hung. ii. 165, t. 153 (1805), non Lamarck (1788).—*Genista genuensis* Persoon, Syn. ii. 287 (1807).—*Cytisus triangularis* Viviani, Fl. Dalm. iii. 268 (1852).

As Schneider points out (Ill. Handb. Laubholzk. II. 32), the oldest name for the plant generally known as *G. triangularis* Willd. will be *G. januensis*, if the statement of O. Kuntze (Rev. Gen. I. cxxxiv), that part II of vol. III of his Species plantarum appeared in 1803 is true. Parts II and III of this work have no title-page only part I has a title-page dated 1800, which, however, should be according to Kuntze 1801. As part I of volume IV is dated 1805, I see no reason to doubt the correctness of Kuntze's statement taken from Kayser's Bücherlexikon (H-L 1835), for it is reasonable to assume that the publication of part II and III of vol. III came between the publication of part I of vol. III and part I of vol. IV and that these parts were not published in the same year as part I of vol. III. Viviani's Elenchus the preface of which is dated July 2 1802 was probably published soon after that date as it is an octavo of only 36 pages.

*Cytisus scoparius* Lk. f. *plenus*, nom. nov.—*C. scoparius* 3. *flore pleno* Hort. apud Loudon, Arb. Brit. II. 595 (1838).

The origin of this slightly double form is not known to me. I have been unable to find any mention of it before 1838 and Loudon says nothing of its origin.

*Cytisus scoparius* Lk. f. *erniensis*, var. nov.—*Sarothamnus erniensis* A. Chevalier in Bull. Soc. Bot. France, LXVII. 324 (1921).

This form differs from *C. scoparius* f. *Andreanus* Dippel in having all the petals changed to a bright red color. Both forms originated from a plant found about or probably before 1870 in France near Ernée (Mayenne). More detailed information about the origin of these two forms is given by Chevalier in the publication cited above.

*Cytisus glabrescens* Sartorelli, Alb. Indig. Ital. Sup. 282 (1816).—*C. emeriflorus* Reichenbach, Fl. Germ. Excurs. 524 (1832).—*Genista glabrescens* Briquet, Études Cytis. Alp. Marit. 123 (1894).

Schinz & Thellung (in Bull. Herb. Boiss. sér. 2 VII. 188 [1907].) and Schneider (Ill. Handb. Laubh. II. 45 [1907].) have rejected the name *C. glabrescens* Sartorelli and taken up instead *C. emeriflorus* on account of the older homonym *C. glabrescens* Schrank (Baier, Fl. 269) of 1789 but that is without doubt a straight synonym of *C. scoparius* Link and is therefore not valid. In reading Schrank's description carefully, one will find that it agrees exactly with *C. scoparius* Link except that the leaves are described as shorter than the petioles, but this is apparently a slip of the pen; instead of "petioles (Blattstiele)" he must have meant "pedicels (Blüthenstiele)." In literature Schrank's name seems to have been either overlooked or treated as a doubtful name.

*Cytisus albus* var. *microphyllus*, comb. nov.—*C. microphyllus* Boissier, Diagn. Fl. Or. sér. 2, II. 5 (1857).—*C. austriacus* var. *microphyllus* Boissier, Fl. Or. II. 53 (1892).—*C. leucanthus* var. *microphyllus* Boissier, Fl. Or. Suppl. 161 (1888).—*C. supinus* subsp. *albus* var. *microphylloides*

Briquet, *Études Cytisus Alp. Marit.* 174 (1894).—*C. supinus* subsp. *C. albus* 6 *microphyllus* Ascherson & Graebner, *Syn. Mitteleur. Fl.* vi. 2, 329 (1907).

This a small prostrate form with smaller leaves and white flowers of *C. albus* known from Transylvania and Thessaly. Its oldest varietal name is "*microphyllus*," but Briquet when making it a variety of *C. supinus* had to change it on account of the older homonym *C. supinus* γ *microphyllus* Wimmer & Grabowski, *Fl. Siles.* II. 2, 50 (1829). The name "*microphyllus*" can stand only if considered a varietal name, as *C. microphyllus* Boiss. is antedated by *C. microphyllus* Link of 1826 and therefore is not valid. Ascherson and Graebner call *C. albus* a subspecies of *C. supinus* but cite it as a binomial which is against the International Rules. As *C. albus* Hacquet of 1790 has priority of *C. albus* Link of 1822 based on *Genista alba* Lamarck of 1786, the combination *C. multiflorus* Sweet, must be used for the latter species, based on the next oldest name *Spartium multiflorum* Aiton of 1789.

*Cytisus albus* var. *pallidus*, comb. nov.—*Cytisus leucanthus* var. *pallidus* Schrader apud De Candolle, *Prodr.* II. 155 (1825).—*C. banaticus* Grisebach & Schenk in Wiegand, *Archiv.* XVIII. 292 (1852).—*C. austriacus* var. *pallidus* Neilreich, *Aufzähl. Ung. Slavon. Pfl.* 330 (1866).—*C. pallidus* Kerner, *Abhäng. Pflanzengest.* 6 (in *Festschr. Versamml.* 43. Deutsch. Naturf. Aerzte) (1869), non Poiret.—*C. variabilis* Blocki in Oester. Bot. Zeitschr. XXXIV. 425 (1884), pro parte.—*C. supinus* subsp. 2, *pallidus* γ var. *pallidus* Briquet, *Études Cytisus Alp. Marit.* 174 (1894).—*C. supinus* [subsp.] II. *C. pallidus* 9 *banaticus* Ascherson & Graebner, *Syn. Mitteleur. Fl.* vi. 2, 329 (1907).

This is a form with pale yellow flowers. If considered a distinct species, it must bear the name *C. banaticus* Griseb. & Schenk, as *C. pallidus* is not a valid name being antedated by *C. pallidus* Poiret, *Enc. Méth. Suppl.* II. 442 (1811). Moreover the combination *C. pallidus* probably based on *C. leucanthus* var. *pallidus* Schrader had been published twice before Kerner used it, though in both cases as a synonym: *C. pallidus* Steudel, *Nomencl.* ed. 2, I. 477 (1841), as a synonym of *C. leucanthus*.—*C. pallidus* Kitaibel apud Nyman, *Consp. Fl. Eur.* 157 (1878), as a synonym of *C. capitatus*.

*Wistaria formosa* (*W. floribunda* f. *alba* × *sinensis*), hybr. nov.

Twining shrub; young branchlets silky-pubescent; leaves 9–13-foliate, rarely 7- or 15-foliate; leaflets oblong, 5–7.5 cm. long and 2–3 cm. broad, acuminate, broadly cuneate at base, entire or occasionally sparingly and minutely denticulate, silky-pubescent at first on both sides, at maturity bright green above and glabrous, lighter green and lustrous beneath with scattered appressed hairs, the midrib toward the base like the petiolule minutely pubescent; petiole and rachis silky-pubescent at first, becoming glabrous. Racemes including the short peduncle about



25 cm. long; rachis densely short-villose; pedicels 1–1.2 cm. long, spreading at a right or somewhat acute angle, rather stout, straight, finely villose; calyx about 7 mm. broad and 5–6 mm. high, finely villose, 2-lipped, the lower lip 3-lobed with broadly triangular, subulate-acuminate lobes, the middle one about 4 mm., the lateral ones 2.5 mm. long; corolla pale violet, wings and keel darker, slightly fragrant, standard about 2 cm across and slightly shorter, with rather thin slightly recurved ligular appendages; wings with the claw 1.7–1.8 cm. long; keel 1.5 cm. long. Pod 7–8.5 cm. long, and 1.8–2 cm. wide at the apex, gradually attenuated toward the base, densely tomentose, usually 1-seeded.

Cultivated at Holm Lea, Brookline, Mass.; specimens collected May 27 and September 12, 1921, preserved in the herbarium of the Arnold Arboretum.

This handsome hybrid originated at Holm Lea about 1905 from seed of *Wistaria floribunda* f. *alba* Rehd. & Wils. planted by Charles Sander and apparently fertilized by pollen of *W. sinensis* flowering simultaneously in the greenhouse. The hybrid is nearly exactly intermediate between these two species. From *W. sinensis* Sweet it is easily distinguished by the larger number of less pubescent leaflets (7–11 in *W. sinensis*), by the longer racemes, the shorter pubescence of the rachis, the long-acuminate lobes of the lower lip of the calyx and by the smaller corolla. From *W. floribunda* it differs chiefly in the smaller number of leaflets narrowed toward the base (13–17 and usually rounded at the base in *W. floribunda*), in the shorter racemes, the shorter and stouter pedicels, the larger corolla, and in the thinner slightly recurved appendages of the standard.

The hybrid as an ornamental plant is superior to both parents, as the racemes are longer than those of *W. sinensis* and fuller, though shorter than those of *W. floribunda* (*W. multijuga* Van Houtte), because the flowers of each raceme all open almost at the same time, while in *W. floribunda* the basal flowers are already dropping, before the terminal ones have opened.

*Robinia pseudoacacia* L. f. *unifoliola* Talou in Horticulteur Franç. 1859, 157, as var.—*R. pseudo-acacia monophylla* Carrière in Rev. Hort. 1860, 630, fig. 121, 122.—Hartwig & Ruempler, Bäume & Sträuch. 490 (1875), as var.—Voss, Vilmorin's Blumengart. 1. 218 (1894), as forma.—*R. monophylla* Jaeger, Ziergeh. 461 (1865).—*R. Pseudacacia heterophylla* hort. ex Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 271 (1903).

The oldest varietal name for the interesting form generally known as var. *monophylla* is *unifoliola* Talou as cited above. It was raised about 1855 by Deniau of Brain-sur-l'Authion, Maine-et-Loire, (according to Carrière) or, of Angers (according to Talou) and offered to the trade by Lebigot of Angers about 1859. About 1880 two variations of this form one with upright and one with pendulous branches were raised from seed of this form by Dr. G. Dieck, of Zöschen, Germany, for which I propose the following names as those given by Dieck are preoccupied.

*Robinia pseudoacacia* f. *dependens*, nom. nov.—*R. pseudo-Acacia monophylla pendula* Dieck in Ill. Monatsh. Gartenb. II. 104 (1883).—Hartwig, Ill. Gehölzb. ed. 2, 332 (1892), as var. *monophylla pendula*.—Voss, Vilmorin's Blumengärt. I. 218 (1894), as f. *monophylla pendula*.—Schneider, Ill. Handb. Laubholzk. II. 83 (1907), as var. *monophylla* f. *pendula*.—*R. Pseudacacia pendula monophylla* Zabel in Beissmer, Schelle & Zable, Handb. Laubholz-Ben. 270 (1903).

As the varietal name *pendula* given by Dieck to this form which may be considered a pendulous subform of *R. pseudo-acacia* f. *unifoliola* is preoccupied by *R. pseudo-acacia pendula* Loudon, a new name is proposed here.

*Robinia pseudoacacia* f. *erecta*, nom. nov.—*R. Pseudo-Acacia monophylla fastigiata* Dieck, Haupt-Cat. Zöschén, 65 (1885).—Hartwig Ill. Gehölzb. ed. 2, 332 (1892), as var. *monophylla fastigiata*.—Schneider, Ill. Handb. Laubholzk. II. 83 (1907), as var. *monophylla* f. *fastigiata*.

The varietal name *fastigiata* given by Dieck to this form is preoccupied by *R. pseudoacacia fastigiata* Neumann<sup>12</sup> and therefore a new name is proposed here.

× *Robinia Slavinii* (*R. Kelseyi* × *Pseudoacacia*), hybr. nov.

Small tree: young branchlets slightly and sparingly villose at first, soon glabrous, slightly zigzag, red-brown at the end of the first season, with few, short and straight prickles. Leaves 9–17-foliolate; leaflets oblong-elliptic to oblong-ovate or narrowly oblong-ovate, the lower ones usually smaller and more or less ovate, 2.5–5 cm. long and 1.2–2.2, rarely to 2.4 cm. broad, obtuse or sometimes emarginate, rarely acutish, mucronulate, glabrous, except slightly pubescent on the midrib beneath when young, yellowish green above, pale green beneath, firm at maturity; petioles 2–3 cm. long, like the rachis very slightly pubescent when young, soon glabrous. Racemes 6–10-flowered, rather loose, with the peduncle 8–13 cm. long; peduncle 2.5–3.5 cm. long, like the rachis slightly and loosely villose and eglandular; pedicels 3–6 mm. long, slightly or sometimes more densely villose, and rarely with a few solitary glands; calyx broad-campanulate, 0.8–1 cm. high, the lower lip divided nearly to the middle into ovate long-acuminate lobes or less deeply divided with triangular-ovate acute lobes, the upper lip less than half as deeply divided, finely and thinly villose; corolla about 2.5 cm. long, rosy-pink, standard rounded, emarginate, about 2 cm. across, wings oblong, without the claw 1.8 long and 8

<sup>12</sup> *R. pseudo-acacia fastigiata* Neumann in Horticulteur Franc. 1857, 222. This is described by the author as a form very similar to *tortuosa*; all the branches ending in a ramification, the leaves long and pendent of a very glaucous color, the large branches somewhat spiny and very short. It is not the *R. pseudacacia* var. *fastigiata* Lemaire which is a synonym of *R. pseudoacacia* f. *pyramidalis* Pepin (in Rev. Hort sér. 2, IV. 240 [1845]).—*R. pyramidalis* Poiteau in Ann. Soc. Hort. Paris, XXXI. 171 [1842].—*R. inermis pyramidalis* Schickler in Gartenfl. VI. 97, t. 190 [1857].—Neubert in Deutsch. Mag. Gart.-Blumenk. 1857, 70, fig.—*R. pseudocacia* var. *fastigiata* Hort. apud Lemaire in Ill. Hort. VI. misc. 20, fig. [1859].—Morren in Belg. Hort. XIV. 27, fig. [1864].—Bean in Gard. Chron. ser. 3, XLI. 151, fig. 69 [1907].

mm. broad, keel 1.5 cm. long without the claw; staminal tube 1.5 cm. long; ovary tuberculate, the tubercles occasionally with a hair-like appendage. Pod 5-6 cm. long and about 1 cm. broad, roughened by small tubercles partly bearing short prickles less than 1 mm. long; seeds about 4 mm. long, obliquely ellipsoid, slightly compressed, dull olive-green, mottled with black.

Cultivated at Rochester, New York; specimen examined: Durand-Eastman Park Nursery, June 6 and July 30, 1919, June 4 and October 10, 1920, B. H. Slavin (No. 3, type, and No. 4; flowers and fruit; Nos. 1, 2, 5 and 6; flowers and mature leaves).

This new hybrid originated at the Durand-Eastman Park, Rochester, New York, from seed of *R. Kelseyi* Hutchins, collected in 1914 by Mr. B. H. Slavin. From this species the hybrid is easily distinguished by the larger and broader often obtuse and even emarginate leaflets, by the larger raceme with a slightly villose rhachis destitute of glandular hairs, by the broader calyx and by the fruit entirely destitute of glandular hairs being only roughened by minute tubercles. From *R. Pseudoacacia* L. which is without doubt the other parent it differs chiefly in the narrower, generally ovate-oblong leaflets often acutish and but rarely emarginate, nearly glabrous when unfolding, in the shorter comparatively few-flowered racemes, shorter pedicels, rosy pink flowers and in the tuberculate fruit. It has some resemblance to *R. Margaretta* Ashe, which possibly is a hybrid between *R. Pseudoacacia* and *R. hispida*, but *R. Margaretta* may be distinguished by the broader, obtuse leaflets silky pubescent beneath when young and by the longer racemes with a sparingly glandular-pilose rhachis and pedicels.

*Robinia Slavinii* is apparently similar in general appearance to *R. Kelseyi* but of more vigorous growth and is tree-like in habit; if the rosy-pink flowers are produced as profusely as in *R. Kelseyi*, it will be a desirable ornamental plant.

× *Robinia ambigua* Poiret in Encycl. Méth. Suppl. iv. 690 (1816) (*R. pseudoacacia* × *viscosa*).—*R. dubia* Foucault in Jour. Bot. Appl. II. 204 (1813), not Poiret.—*R. hybrida* Audibert ex De Candolle, Prodr. II. 262 (1825), as synonym.—*R. intermedia* Soulange-Bodin in Ann. Soc. Hort. Paris, II. 43 (1828).

This hybrid Robinia was raised from seed of *R. viscosa* by Emmanuel de Foucault and flowered for the first time in 1812. The name *R. dubia* which has been used by most authors for this form, should be replaced by *R. ambigua* on account of the older *R. dubia* Poiret (in Encycl. Méth. VI. 227) of 1804 which must be considered a valid name from a nomenclatorial point of view, though it is now referred to the genus *Sabinea*. Loudon and also Schneider and A. Henry mention as possibly belonging here *R. echinata* Miller, Dict. ed. 8 (1768), but the descriptive phrase "leguminibus echinatis" hardly applies to this hybrid, and, moreover, *R. viscosa* Vent. one of its supposed parents was not introduced until



1797, though a tree growing in the garden of the Bishop of London at Fulham which Miller refers to his *R. echinata* and describes as having much shorter pods densely beset with short prickles but otherwise resembling *R. pseudo-acacia* may have been *R. viscosa*; the fact that this tree "produced plenty of seeds" also speaks against its hybrid nature. Even if the identity of the Fulham tree should be established, the name *R. echinata* could not be applied to it as it is based primarily on Boerhaave's *Pseudoacacia vulgaris* which is partly *Robinia pseudoacacia* (as to Tournefort's name), while the other citations refer to a tree figured by Cornut (Canad. Pl. Hist. 172) which has subsessile flowers and one-seeded spiny legumes and is not a *Robinia*.

The adoption of the name *R. ambigua* makes necessary the following new combination.

*Robinia ambigua* var. *bella-rosea*, comb. nov.—*R. bella-rosea* Nicholson, Dict. Gard. III. 310 (1887).—Mottet, Dict. Hort. IV. 515 (1896–7).—*R. viscosa* f. *bella-rosea* Voss, Vilmorin's Blumengärt. I. 219 (1894).—*R. dubia* var. *amoena* Hort. apud Mouillefert Arb. Arbriss. I. 567 (1894).—*R. pseudo-acacia* var. *bella-rosea* Cowell in Bailey, Cycl. Am. Hort. IV. 1538 (1902).—*R. dubia* var. *bella-rosea* Rehder in Mitteil. Deutsch. Dendr. Ges. XXIV. 223 (1915).

This form is nearer to *R. viscosa* while the typical *R. dubia* is closer to *R. pseudoacacia*. When and where this form originated I have not been able to find out, but it must have originated before 1880, for in 1883 it was in cultivation at Kew, as specimens in the herbarium of the Arnold Arboretum collected in that year by G. Nicholson show. If *R. viscosa bellidiflora* Hort. apud Eismann in Hamburg. Gart. Blumenzeit XXXIV. 117 (1878) belongs here, is doubtful.

*Caragana frutex* K. Koch var. *macrantha*, nom. nov.—*C. frutescens* var. *grandiflora* Rehder in Bailey, Cycl. Am. Hort. I. 242 (1900), not Regel (1866).—*C. frutex* var. *grandiflora* Koehne Herb. Dendr. no. 514 (1904), in sched.—Schneider, Ill. Handb. Laubholz. II. 103, fig. 64w-y (1907).—Komarov in Act. Hort. Petrop. XXIX. 226 (1908).—Rehder in Bailey, Stand. Cycl. Hort. II. 160 (1914).

As the name *C. frutescens* var. *grandiflora* Rehder is preoccupied by *C. frutescens* var. *grandiflora* Regel in Bull. Soc. Nat. Mosc. XXXIX. 570 (1866) it is not a valid varietal name and must be changed even though Regel's varietal name, which is based on *C. grandiflora* DC. is generally referred as a synonym to that species which is kept distinct by most authors or referred to *C. pygmaea* as a variety. *Caragana frutex* var. *macrantha* occurs apparently occasionally with the type for one branch of a specimen collected by P. N. Krilof near the village Lokot, western Siberia, on May 14–16, 1901, represents this form, while the other is typical *C. frutex*.

**Desmodium Franchetii**, nom. nov.—*D. cinerascens* Franchet, Pl. Delavay. 174 (1890), not A. Gray.

Franchet's name for this species cannot stand on account of the older *D. cinerascens* A. Gray (Pl. Wright II. 48 [1853]), a Mexican species of the Sect. *Heteroloma*. *Desmodium Franchetii* seems most closely related to *D. tiliaefolium* G. Don, but differs according to Franchet's description chiefly in the smaller obtuse leaflets rounded at the base, in the deltoid-lanceolate calyx-teeth as long or longer than the tube and in the standard being somewhat longer than the wings.

**Desmodium spicatum**, nom. nov.—*D. tiliaefolium* Craib in Sargent, Pl. Wilson II. 104 (1914), not G. Don.—*D. cinerascens* Hutchinson in Bot. Mag. CXLV. t. 8805 (1919), not Franchet nor A. Gray.

As already pointed out by Mr. Hutchinson in the Botanical Magazine the specimens of *Desmodium* from western Szech'uan referred to *D. tiliaefolium* do not belong to that species, but his identification of the plant from western Szech'uan with *D. cinerascens* Franchet does not seem to be correct. Though I have not seen the type specimen of Franchet's species, his description differs in several important characters, as in the short-attenuate obtuse leaflets, in the terminal panicle with pubescent branches, and in the calyx divided to the middle or below into deltoid-lanceolate teeth. In *D. spicatum* the leaflets are not attenuate at the apex, the inflorescence is an unbranched spike and the calyx-teeth are broadly ovate, shorter than the tube and subacute or obtuse; occasionally the terminal spike may be augmented by lateral spikes at its base, but these lateral spikes are in the axils of foliage leaves and do not form a part of the terminal spike proper.

As stated by Mr. Hutchinson the plate in the Botanical Magazine was prepared from material sent by Miss Willmott from Warley Place and raised from Chinese seed collected by Mr. E. H. Wilson. He probably collected the seed in western Szech'uan in one of the localities where he collected the species in flower under Nos. 2936, 2937 and 2940 of his herbarium collection. The plant introduced by M. de Vilmorin in 1896 and distributed as *D. cinerascens* also represents *D. spicatum*, as specimens show which I collected in 1911 in Vilmorin's Fruticetum at Les Barres and in Chenault's nursery at Orléans.

#### MISCELLANEOUS GENERA

**Pinus resinosa** Sol. f. **globosa**, forma nova.

A typo recedit habitu humiliore densa globosa, foliis paulo tenuioribus. Hort. Mrs. George A. Carpenter, Wolfeboro, New Hampshire; herbarium specimens collected March 23, 1921, and photographs of the original plants preserved at the Arnold Arboretum.

Three plants of this distinct and handsome form were found in the woods near Wolfeboro, New Hampshire and transplanted to the grounds of Mrs. George A. Carpenter. They are now approximately 20 to 25 years old and  $5\frac{1}{2}$  to 8 feet tall forming dense globose heads about  $8\frac{1}{2}$  feet in diameter. The leaves are as or nearly as long as in the typical form but slenderer. It has not yet produced cones.

This is the first variation known of *P. resinosa* Sol. and therefore of interest. Young plants grafted from the original plants are growing at this Arboretum.

*Ulmus americana* L. f. *columnaris* f. nov.

A typo recedit ramis erectis columnam satis angustam formantibus. — Ramuli juveniles pubescentes; folia elliptica, 7–14 cm. longa 4–7.5 cm. lata, basi valde obliqua, dupliciter argute serrata supra adpresse scabripilosa, subtus secus costam et in venis venulisque pilosa; petioli pubescentes, 2–3 mm. longi.

NEW YORK: Conesus Lake, Livingston County; specimens collected June 10, 1911, by R. E. Horsey and T. Malloy and photographs taken by R. E. Horsey at the same date and earlier in a nearly leafless state are preserved in the herbarium and in the photograph collection of the Arnold Arboretum.

This very distinct columnar form of the American Elm was discovered by Mr. John Dunbar; the tree is standing inside a garden wall near the roadside and is about 20 m. tall with a columnar crown about 6 m. in diameter, of almost equal width from the base to the top which is flattened, ending in many branches of nearly equal height; the trunk measures 0.75 m. near the base and divides somewhat below the middle into several strong limbs ascending at a very acute angles. The leaves differ from those of the common form in being rather broad, measuring up to 7.5 cm. in width, very sharply and deeply doubly serrate, scabrous above, pilose on the veins and veinlets beneath and very unequal at the base; the petioles are very short, not exceeding 3 mm. in length and the young branchlets are pubescent.

Another tree of nearly similar habit is growing in Seneca Park, Rochester, New York, of which a photograph taken by R. E. Horsey on September 1, 1920, is in the collection of the Arnold Arboretum.

There is no earlier record, as far as I know, in botanical or horticultural literature of a columnar form of the American Elm, while the pendulous form was distinguished as early as 1789 by Aiton as *U. americana* var. *pendula*.

*Aristolochia durior* Hill, Twenty-five New Pl. 9, t. 24 (1773). — Reherder, Bradley Bibliog. II. 182 (1912). — *A. macrophylla* Lamarck, Encycl. Méth. I. 255 (1783). — *A. Sipho* L'Heritier, Stirp. Nov. 13, t. 7, 7b (1784 [1785]).

Hill's name for the plant now generally known as *Aristolochia macrophylla* Lamarck seems to have entirely escaped notice; it does not appear in Index Kewensis and no mention of it can be found in literature elsewhere until I enumerated it in the Bradley Bibliography in 1912. As



it antedates Lamarck's name by 10 years, its resurrection cannot be avoided, though one has to concede that neither Hill's description nor his figure are very good, but they are sufficient to identify the plant; on the plate the leaves and the habit of the plant are fairly characteristic and represent unmistakably the *A. macrophylla* Lam., but the flowers show little resemblance to those of that species and look more like badly drawn flowers of *A. Clematitis* L.; the author apparently had at his command only a specimen without well developed flowers and probably reconstructed them on the lines of those of the well-known *A. Clematitis*.

It may not be amiss to append here a note on another American shrub figured by Hill on plate 18 of the same work. This is *Viburnum lanceolatum* which is referred in Index Kewensis as a synonym to *V. obovatum* Walt. and in Steudel's Nomenclator to *V. laevigatum* Ait., a synonym of *V. obovatum*. If this identification were correct, then *V. lanceolatum* first published by Hill in his Hort. Kew. 457, t. 19 (1768) would have priority over *V. obovatum* Walter of 1788, but the figure published with the original description, of which that in his Twenty-five new plants is only an enlarged copy, represents without doubt *V. nudum* L. and therefore *V. lanceolatum* Hill becomes a synonym of that species.

*Hydrangea opuloides* var. *japonica* Schneid. f. *coerulea*, comb. nov. — *H. Belzonii* Siebold & Zuccarini, Fl. Jap. I. 109, t. 55 (1840). — *H. japonica* var.  $\beta$ . *caerulea* Hooker in Bot. Mag. LXXII. t. 4253 (1846). — *H. Hortensia*  $\beta$ . *coerulea* K. Koch, Hort. Dendr. 106 (1853). — *H. japonica* E. *coerulescens* Regel in Gartenfl. 290 (1866). — *H. Hortensia*  $\alpha$ . *Belzonii* Maximowicz in Mém. Acad. Sci. St. Pétersb. x. no. xvi. 14 (1867). — *H. opulodes* a. *japonica* f. *Belzonii* Voss, Vilmorin's Blumengärt. I. 287 (1894). — Schneider, Ill. Handb. Laubholz. I. 392 [*opuloides*] (1905). — Rehder in Bailey, Standard Cycl. Hort. III. 1621 (1915), as var. of *H. opuloides*. — *H. hortensis* var. *Belzonii* Rehder in Bailey, Cycl. Am. Hort. II. 784 (1900).

This blue-flowered form of *H. opuloides* var. *japonica* seems to be one of the hardiest forms of this species and is doing well on Long Island where it is reported to be a great favorite in gardens. It is half-hardy in the Arnold Arboretum, being killed back more or less every year, but enough of the old wood is usually left to produce flowers which appear at the end of lateral branchlets on the branches of last year. This and *H. opuloides* *rosalba* Rehd. are the only forms fairly hardy in this Arboretum; *H. opuloides* *cyanoclada* Dipp. persists, but does not flower.

*Vitis Slavini* (V. *Lecontiana*  $\times$  *vulpina*), hyb. nov.

Young branchlets glabrous or nearly so. Leaves orbicular-ovate in outline, 8–14 cm. long and 8 or 9 to 13 cm. broad, deeply cordate at base with a wide open sinus, 3–5-lobed, the lobes unequally coarsely dentate, with broad triangular or rounded, acute or abruptly mucronulate teeth much broader than long, the upper lobes broad-ovate or sometimes

triangular-ovate, the sinuses or at least the two upper sinuses broad and rounded reaching nearly halfway to the base, rarely shallow, dark green and glabrous above, light green beneath, thinly floccose-villose over the whole surface or pilose or villose only on the veins and veinlets, rarely nearly glabrous at maturity; petioles 4–12 cm. long, sparingly villose or pilose chiefly in the grove, or nearly glabrous. Flowers not seen. Fruit in long narrow panicles without the peduncle 5–7.5 cm. long and 3–3.5 cm. across; berries globose or depressed-globose, 0.9–1.3 cm. in diam. blue-black, bloomy, slightly acid; seeds 1–4, ovoid, 5–6 mm. long, with a small chalaza.

NEW YORK: Banks of Genesee River, Seneca Park, Rochester, August 30, 1920, *B. H. Slavin* and *R. E. Horsey* (type); September 15, 1920 *B. H. Slavin*, August 9, 1913, *B. H. Slavin*.

There can be little doubt that this Grape Vine is a natural hybrid between *V. Lecontiana* House (*V. bicolor* Le Conte, not Raf.) and *V. vulpina* L., as both those species grow in the locality where Mr. Slavin discovered this form which is clearly intermediate between the two species. From *V. Lecontiana* the hybrid is easily distinguished by the greenish or grayish green, not whitish under side of the leaves, their coarser more prominent serration and their usually smaller size. From *V. vulpina* it differs chiefly in the partly deeply lobed leaves with rounded sinuses, the shorter much broader teeth and in the more or less pubescent and somewhat grayish green under side of the leaves and the narrower and slenderer fruiting panicle. Some specimens as those collected on August 9, 1913, and one of the two collected September 15, approach more closely *V. vulpina* in their only shallowly lobed leaves slightly pubescent beneath along the veins, but the influence of *V. bicolor* is shown by the much broader and shorter teeth and the acute narrow basal sinus of the leaves.

× *Vitis Andersonii* (*V. Coignetiae* × *vulpina*), hybr. nov.

Young branchlets at first covered with a floccose tomentum soon becoming glabrous or glabrescent, or nearly glabrous from the first. Leaves broadly triangular-ovate, 10–20 cm. long and about as broad, 3-lobed, with broadly triangular acuminate lobes, coarsely and very unequally toothed with broad triangular acute, or short-acuminate and mucronulate teeth, the sinus deep and broad its sides diverging at an acute or right angle, rarely at an obtuse angle with nearly truncate base, densely floccose-tomentose while young or only slightly cobwebby and pubescent on the veins and veinlets beneath, at maturity covered beneath on the veins and veinlets with long-lanuginose hairs or only pilose on the veins and larger veinlets; petioles 3.5–7 cm. long, with a floccose-tomentose pubescence while young or pilose particularly toward the apex, sometimes glabrous or nearly so. Flowers not seen. Fruiting panicle rather small, 4–7 cm. long, berries globose, 1–1.2 mm. diam., bluish black and bloomy; seeds obovoid 6–7 mm. long, light grayish brown with a narrowly obovate small chalaza in the middle of the seed.

Originated in the garden of Mrs. Bayard Thayer at Lancaster, Massachusetts. Specimen examined: Hort. Bayard Thayer, Lancaster, Mass., July 27, 1920, *C. S. Sargent* (type); Arnold Arboretum, July 29, August 25 and September 28, 1920, *Alfred Rehder*.

This hybrid was raised by Mr. William Anderson, gardener to Mrs. Bayard Thayer at Lancaster, Mass., from seed of *Vitis Coignetiae* Planch. apparently fertilized by a nearby *V. vulpina* L. I have specimens of both parent plants before me; the *V. Coignetiae* is not the typical densely tomentose form but the var. *glabrescens* Nakai which at maturity is only very thinly covered by a cobwebby tomentum, so that the under side appears grayish green or greenish and not densely rusty-tomentose; the *V. vulpina* is typical in the shape and serration of the leaves, but the veins and stronger veinlets beneath are pilose. From *V. Coignetiae* the new hybrid is easily distinguished by the smaller more deeply 3-lobed leaves, the coarser serration with triangular, acute or short-acuminate teeth and by the very slight or entirely absent floccose tomentum on the under side of mature leaves. From *V. vulpina* it differs chiefly in the usually larger less deeply 3-lobed leaves, in their narrower basal sinus its sides diverging at an acute or right angle, in the broader and shorter scarcely acuminate teeth and in the more pubescent under side. The different plants of this hybrid show a great variation and represent almost all intermediate stages between the two parent species; some being so near to *V. vulpina*, that they can only be distinguished from it by the narrow basal sinus of leaves, very wide and nearly truncate near the petiole in *V. vulpina*.

**Cornus Dunbarii** (*C. asperifolia* × *macrophylla*), hybr. nov.

Tall shrub; becoming tree-like, with upright or ascending branches young branchlets slightly quadrangular with sparse short appressed hairs, dull purple the second year and usually soon becoming brown and developing numerous short longitudinal fissures. Leaves elliptic-ovate to oblong-ovate, 6–12 cm. long or on vigorous shoots to 16 cm. long, 2.5–6 cm. broad, long-acuminate, broad-cuneate or rounded at the base, dark yellowish green above and slightly rough from short hairs, glaucous beneath, rather densely covered with loosely appressed or partly slightly spreading, straight or partly curved hairs, with 5–7 pairs of veins prominent and yellowish beneath, like the midrib furnished with sparse appressed or slightly spreading hairs or nearly glabrous; petioles 1–2 cm long, with short appressed hairs. Flowers in rather dense often slightly paniculate corymbs 5–6.5 cm. across; peduncle 3–3.5 cm. long, minutely appressed pubescent with short fulvous hairs, the branchlets of the corymb more densely pubescent with similar but whitish and partly slightly spreading hairs; pedicels very short; ovary densely appressed-pubescent; calyx-teeth subulate to 0.5 mm. long, exceeding the disk; petals oblong-lanceolate, 3.5–4 mm. long; filaments slightly shorter; style 2.5–3 mm.



long, sparingly appressed pubescent, not thickened below the apex. Fruits unknown. Fruit sparingly produced, subglobose, 5-6 mm. thick blue or rather light blue, appressed-setulose; stone slightly higher than broad, 4 mm. long and 3.75 mm. wide, slightly compressed and slightly oblique, faintly ribbed.

Cultivated at Highland Park, Rochester, New York and in the Arnold Arboretum; specimens seen: Highland Park, August 29, 1919, and July 9 and September 6 or 16, 1920, *Wm. L. G. Edson* (No. 0-1108, type), July 12, 1920 (No. 0-1105); August 29, 1919 (No. 0-1106); Aug. 29, 1919 and July 17, 1920 (No. 0-1109), and July 17, 1920 (No. 0-1110), *Wm. G. L. Edson*; Arnold Arboretum, September 13, 1921, *A. Rehder* (plants received from Rochester in 1916).

This hybrid originated in Highland Park at Rochester from seed of *Cornus macrophylla* Wall. (*C. brachypoda* C. A. Mey.), but differs from that species in the slenderer paler colored branchlets, in the narrower somewhat smaller leaves, rough above by short scabrid hairs, and beneath covered with more numerous longer less closely appressed and partly curved hairs, in the fewer more or less pubescent veins, (usually 7-8 in *C. macrophylla* and glabrous beneath), it further differs in the denser and smaller, more pubescent umbel-like corymb, in the pubescent style and in the blue fruit. In these characters the hybrid approaches *C. asperifolia* Michx. which is probably the other parent, but it differs from that species in the larger leaves, only slightly rough above, and beneath with nearly appressed pubescence, in the more numerous slightly appressed pubescent veins (in *C. asperifolia* 4-5 and furnished with spreading villose hairs), in the sparingly appressed pubescent inflorescence, in the longer sepals and longer petals and in the blue fruit.

Though this hybrid is not as handsome as *C. macrophylla* it has the advantage of being hardier and therefore may be recommended for regions where *C. macrophylla* will not stand the winter.

× *Cornus Horseyi* (*C. amomum* × *macrophylla*), hybr. nov.

Large shrub, with spreading branches, young branchlets slightly quadrangular with sparse short appressed hairs, becoming dark purple at the end of the season. Leaves elliptic-ovate to oblong ovate, 5-10 or on shoots to 12 cm. long, 2-5.5 cm. broad, long-acuminate, broadly cuneate or nearly rounded at base, dark yellowish green above and appressed-pubescent at first, soon glabrous, grayish green or pale green beneath sparingly furnished with straight appressed hairs, occasionally intermixed particularly toward the base of the leaf with fulvous hairs, with 5-7 pairs of veins, prominent beneath and slightly appressed-pubescent or nearly glabrous, the midrib beneath furnished with scattered appressed minute fulvous hairs, intermixed with pale hairs; petiole 0.5-2 cm. long, with minute appressed fulvous and pale hairs. Flowers in rather dense, convex or rather flat corymbs 5.5-6.5 cm. across; peduncle 3-4 cm. long

minutely and sparingly appressed-pubescent; the branches of the inflorescence with appressed or slightly spreading mostly pale hairs; pedicels 1-4 mm. long, appressed-pubescent; ovary densely whitish appressed-pubescent; calyx-lobes triangular and acuminate to ovate-oblong, exceeding the disk; petals oblong-lanceolate, 4.5-5 mm. long, not or slightly longer than filaments; style 3.5 mm. long, glabrous or with few scattered appressed hairs, usually more or less thickened below the stigma. Fruit sparingly produced, subglobose, 6-7 mm. thick, dark dull blue, appressed setulose; stone distinctly broader than high, about 4 mm. high and 5 mm. broad, oblique, slightly compressed, slightly ribbed.

Cultivated in Highland Park, Rochester, New York, and in the Arnold Arboretum; specimens examined: Highland Park, August 29, 1919, Horsey & Edson and July 13, 1920, *Wm. L. G. Edson* (No. 0-1104); Arnold Arboretum July 13, 1920, and September 13, 1921, *A. Rehder* (plants received from Rochester in 1916).

This new hybrid originated like the preceding in Highland Park, Rochester, from seed of *C. macrophylla*. From that species it differs in its slenderer branchlets, the smaller and narrower leaves, pale or grayish green, not whitish beneath, with fewer veins, in the presence of fulvous hairs on the petiole and on the under side of the leaf toward the base, the smaller slightly pubescent corymb and in the oblique stone distinctly broader than high. From *C. Amomum* it differs chiefly in the larger, long-acuminate leaves with more numerous veins, grayish green beneath and with pale not fulvous-pubescent midrib and veins, and in the less pubescent, somewhat larger and looser corymbs and darker-colored fruits. From the preceding hybrid, *C. Dunbarii*, it differs chiefly in the more spreading habit, more glabrous leaves smooth above, grayish green, not glaucescent beneath, in the glabrous or nearly glabrous longer style more or less thickened below the stigma, and in the larger, darker-colored fruit with the oblique stone distinctly broader than high.

This hybrid is not quite as handsome as *C. macrophylla*, but like the preceding hybrid apparently hardier and therefore to be recommended for regions where *C. macrophylla* is not hardy. Which of the two hybrids is to be considered superior in regard to its ornamental qualities remain to be determined; judging from the herbarium specimens *C. Dunbarii* seems to be a more vigorous shrub with larger leaves, while *C. Horseyi* seems to be more showy when in flower.

Hybrids of *C. macrophylla* possibly occur also in European gardens. In the Botanic Garden at Muenden, Germany, I collected in 1895 a specimen named *C. macrophylla* which may be a hybrid between *C. macrophylla* and *C. sanguinea*, and in the Jardin des Plantes at Paris I found in 1901 a plant cultivated as *C. Thelycrania* which is probably of similar origin. The original *Cornus Thelycrania* is a synonym of *C. macrophylla* and a plant collected in Kew Gardens by G. Nicholson in 1882 under the probably corrupted name *C. Theleriana* is typical *C. macrophylla*.

× *Rhododendron holmleense* *R. discolor* × ([*catawbiense* × ?]), hybr. nov.

Shrub: Young branchlets with scattered minute stipitate glands, soon glabrous; winter-buds ovoid to ovoid-oblong, pointed, to 3.5 cm. long, with many ovate, acuminate or mucronate greenish scales, puberulous outside, glabrous and lustrous inside except toward the apex, fimbriate on the margin with brown elongated glands and toward the apex with villose ferrugineous hairs. Leaves oblong-lanceolate to oblong-oblancoate or elliptic-oblong, 8–15 cm. long, 3.5–5.5 cm. broad, acute or obtusish and mucronulate at apex, abruptly contracted and rounded at the base or sometimes broadly cuneate, dark green and finely impressed-reticulate above, pale grayish green or glaucescent beneath and finely reticulate with the areoles between the veinlets slightly elevated, glabrous except a very slight floccose tomentum on the upper surface when unfolding, with 12–16 lateral veins; petioles stout, 1–2 cm. long, stipitate-glandular at first, soon quite glabrous. Flowers in 10–15-flowered umbel-like racemes; rhachis 2–5 cm. long, glabrous; pedicels 2.5–4 cm. long, rather densely but minutely stipitate-glandular, calyx with broadly semiorbicular to nearly obsolete lobes, not more than 2 mm. high, minutely glandular-ciliolate, outside glabrous or very slightly stipitate-glandular; corolla rotate-campanulate, 7–9 cm. across, pale amaranth pink to nearly white the upper lip below the lobe with dark markings of Pompeian red to madder brown often confluent toward the base, or without any markings, lobes 5–6, semiorbicular to orbicular-ovate, about 3 cm. long or 3.5–4 cm. broad, rounded or slightly emarginate at apex and plane or slightly undulate at the margin, tube about 3 cm. long, slightly pilose inside stamens 10–12, very unequal, 2–3.5 cm. long, pilose on the lower third whitish; anthers ochraceous and 4 mm. long or more or less abortive; style 3.5–4 cm. long, reaching nearly to the middle of the upper lobe strongly curved upward near apex, stipitate glandular only at base or nearly the whole length, whitish, stigma capitate, broad and flattened; ovary stipitate-glandular sometimes interspersed with a few scattered hairs, usually 8-celled, sometimes 6–7-celled.

Cultivated at Holm Lea, Brookline, Mass., and at the Arnold Arboretum; specimens of several forms including the type collected at Holm Lea in May, 1921 (flowering in the greenhouse) and at the Arnold Arboretum on June 7, 1921, are preserved in the herbarium of the Arnold Arboretum.

This beautiful hybrid was raised by Charles Sander in 1915 at Holm Lea from *R. discolor* Franchet fertilized with the pollen of an unnamed hybrid seedling form of *R. catawbiense*. A large number of seedlings were raised of which some were almost indistinguishable from *R. discolor*, while others were clearly intermediate between that species and *R. catawbiense*. These intermediate forms differ from *R. discolor* in the generally smaller and comparatively broader leaves and shorter petioles, in the glandular pedicels, the 5- or 6-lobed corolla with a short much wider tube and usually spotted upper lip, in the 10–12 stamens more or less pilose toward the base and in the style being usually glabrous at



least above the middle. From *R. catawbiense* the hybrid differs chiefly in narrower more pointed leaves, in the glabrous rhachis, the glandular not villose longer pedicels, the usually or often 6-lobed corolla, the stamens with whitish filaments, often 12 in number and the, at least toward the base, more or less stipitate-glandular style, and in the usually 8-celled ovary. It seems rather remarkable that the ovary even in the flowers with ten stamens and a 5-lobed corolla should be usually 8-celled, while in regard to the number of the corolla-lobes and the stamens the influence of *R. discolor* is less strong.

Several forms have been raised, the one I consider the type of this hybrid group has large flowers 8-9 cm. wide, of amaranth pink color with a large blotch of partly confluent dots colored Pompeian red; the corolla is usually 6-lobed, the lobes with undulate margin and the number of stamens 12; the anthers are large, ochraceous and apparently well developed, the style is nearly glabrous, the leaves are generally oblong-lanceolate. This form is distinguished as "Charles Sander."

Other forms have light pink or nearly white flowers with fewer or almost no dots with the style glandular throughout or sparingly pilose below the middle and with sterile anthers in one case; in one form the leaves are broadly obovate to obovate-oblong.

In its large open flowers this hybrid is similar to *R. discolor* Franch., but it is hardier and for this reason a valuable addition to the number of hybrid Rhododendrons adapted for cold regions. Though not as resistant as the hardier hybrids of *R. catawbiense*, it has proved fairly hardy in the neighborhood of Boston having stood the last two or three winters in sheltered locations out-of-doors at Holm Lea and in the Arnold Arboretum and has flowered this year in both places; *R. discolor* in the same localities has suffered, and cannot be recommended for this latitude.

*Rhododendron obtusum* var. *arnoldianum* (var. *amoenum*  $\times$  var. *Kaempferi*), var. nov.

This cross was raised at the Arnold Arboretum about 1910 from seed of *R. obtusum* var. *Kaempferi* Wils. fertilized by *R. obtusum* f. *amoenum* Wils. It is exactly intermediate in habit, in size and color of the flowers and in size, texture and persistency of leaves. From the var. *Kaempferi* it is distinguished by the lower denser habit, smaller, darker and more lustrous leaves, 2.5-4 cm. long, by the more numerous and broader persistent summer leaves below the winterbuds and by the smaller flowers 3-3.5 cm. across and in color between rosy mauve to nearly red (rosolene purple, rose color and rose dorée according to Ridgway) and by the shorter and broader sepals. From the f. *amoenum* the cross differs in the more upright habit, the larger acute, usually less lustrous and thinner leaves, in the less numerous and narrower summer leaves below the winterbuds, by the larger flowers with a normal calyx, and the slightly spotted corolla which is usually nearer to rose-color, rarely rosolene purple as in f. *amoenum*. The seedlings show some variation in the size of the

flowers and in their color as stated above and it is probably difficult or even impossible to distinguish them from certain forms of *f. japonicum*, the Kurume Azaleas, but as they are of different origin and have the advantage of being perfectly hardy in the climate of Boston, it seemed advisable to distinguish them by a definite name, commemorating their place of origin.

Cultivated at the Arnold Arboretum under No. 10932; specimens collected May 20, 1916, June 8, 1917, May 20 and October 12, 1918, and May 12, 1921 (No. 10932, a (type), b-d) are preserved in the herbarium of the Arnold Arboretum.

× *Ligustrum ibolium* Coe in litt. 1919 (*L. obtusifolium* × *ovalifolium*). — "Ibodium Privet" in Elm City Nursery Co. Price-list, 1921 41, fig.

Upright shrub; young branchlets puberulous, the pubescence chiefly in two opposite longitudinal rows, soon glabrous or nearly glabrous. Leaves elliptic-ovate to oblong-ovate, acute to acuminate, broadly cuneate at base, sparingly and finely pubescent above chiefly toward the midrib, glabrous or nearly so at maturity, pubescent on the midrib and sparingly on the veins beneath and with a few scattered hairs on the surface, glabrous at maturity except on the midrib; petioles glabrous or nearly so, 2–3 mm. long. Flowers in terminal, loose, pyramidal panicles 8–12 cm. long, usually leafy or with leafy bracts below, the lower lateral branchlets elongated, 3–6 cm. long; axes puberulous or nearly glabrous, the lateral ones sharply 4-angled; flowers nearly sessile; the calyx glabrous with truncate margin; corolla-tube about 5 mm. long, lobes short reflexed; anthers exserted, about as long as corolla-lobes; filaments partly exserted. Fruit subglobose, 5–7 mm. long, black, bloomy.

Cultivated in the Elm City Nurseries and in the Arnold Arboretum; specimens in herb. Arnold Arboretum: Elm City Nurseries, New Haven Conn., July 9, 1920 (No. 22, type, Nos. 1, 13, 37, 38, 41), November 16, 1917, and Nov. 10, 1919; Arnold Arboretum, July 13, 1920 (No. 13) and June 28, 1921.

This hybrid originated in the Elm City Nurseries, New Haven, Connecticut, about 1910. It is intermediate between the supposed parents *Ligustrum obtusifolium* Sieb. & Zucc. (*L. ibota* Sieb., not Blume)<sup>1</sup> and *L. ovalifolium* Hassk. From *L. ovalifolium* it is easily distinguished by the puberulous young branchlets and inflorescence, by the pubescence of the young leaves persistent on the under side of the midrib, while from *L. obtusifolium* it differs chiefly in the less pubescent, soon nearly glabrous branchlets, the larger, acute, never obtuse or obtusish glabrescent leaves, the glabrous calyx and the larger and looser inflorescence and in

<sup>1</sup> It is unfortunate that the now generally accepted name *Ligustrum ibota* Sieb. is to be superseded by *L. obtusifolium* Sieb. & Zucc., as *L. ibota* Sieb. though an earlier name, is a nomen nudum, having been published without any description or citation of a synonym and therefore uncertain to which of the several Japanese species it should be applied. The name *L. ibota* Siebold & Zuccarini of 1846 will then become the valid name for *L. ciliatum* Blume of 1850, a rarely cultivated species of little ornamental merit.

the more exerted anthers. The form considered the type is more similar to *L. ovalifolium*, but among the numerous seedlings raised of this hybrid, there are several, as Nos. 1, 37, and 38 which in the shape of the inflorescence and in habit are nearer to *L. obtusifolium*, but they differ in the glabrescent branchlets, leaves and inflorescence.

As an ornamental shrub and hedge plant it is superior to the popular California Privet (*L. ovalifolium*) on account of its greater hardiness and the fact that it branches more fully from the very base.

*Viburnum dilatatum* Thunb. f. *xanthocarpum*, f. nov.

A typo recedit fructu pallide luteo.

Cultivated at the Arnold Arboretum under No. 10140; specimens collected on September 13, 1921, preserved in the herbarium of the Arnold Arboretum.

This handsome new yellow-fruited form was received in 1919 from Mr. J. H. Bowditch of Pomfret, Conn., and fruited this year for the first time in the Arnold Arboretum. With its light yellow fruits it will prove a valuable addition to the Viburnums with ornamental fruits and forms a pleasing contrast to the typical *V. dilatatum* with dark red fruits.

(To be continued)

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## NOTES FROM AUSTRALASIA, III.

### THE HOBART BOTANICAL GARDENS

E. H. WILSON

THE Hobart Botanical Gardens adjoin the grounds of Government House and are situated on the right bank of the River Derwent about one mile from the business centre of Hobart city. The site is a hillside, roughly crescent-shaped, some 27 acres in extent, laid out in a series of terraces sloping toward the river, a fine tidal stream, about a mile wide at this point. The situation is decidedly good, the steep, sloping banks affording protection from winds. The soil is black diabase, rather heavy, of excellent quality though here and there it is shallow. Under the name Colonial Gardens the commencement appears to have begun in 1818<sup>14</sup> but little progress was made prior to 1828 when Governor Arthur appointed William Davidson to be the first superintendent, at a salary of £100 per annum with a ration and a house to live in. We are told that under Mr. Davidson the Gardens developed rapidly and that among other activities he gathered seeds of 150 species of native plants on the slopes and summit of Mt. Wellington to grow in the Gardens. By 1830 the area enclosed was about 13 acres and twelve gardeners and twelve of the convict chain-gang were employed in cultivating the garden and

<sup>14</sup> See "The foundation and early work of the Society" by E. L. Piesse in *Papers & Proceedings of the Royal Society of Tasmania* (1913).



cleaning the Domain. The Gardens became a popular resort and on the 19th of December, 1832, Governor Arthur directed that they be closed on Sunday, the superintendent having represented "the extreme inconvenience and injury which arises from the great number of persons who resort there on the Sundays." The expenditure during Governor Arthur's term of office was about £300 a year but it increased rapidly and in 1842 was over £800. This seems to have disturbed the authorities in London and in 1843 the Secretary of State informed the Governor, Sir Eardley Wilmit, that the gardens were no longer to be maintained at the public expense. An arrangement was made under which on October 14th, 1843, the Gardens were placed under the management of the newly organized "Botanical and Horticultural Society of Van Diemens's Land," the Government assisting with a small, annual grant of money. This arrangement was maintained until the end of 1885 when in exchange for other privileges the Society gave the gardens back to the Crown. That this Society with a small membership and little funds doggedly maintained the gardens is greatly to its credit and its zeal contrasts favorably with that of the Home Government who abandoned their charge soon after founding it. In 1845 Mr. F. W. Newman of Sydney was appointed superintendent and held the position until 1859. Newman appears to have been an energetic man and under him the gardens were extended, did much useful work, and grew rapidly in favour as a public resort. The annual number of visitors increased from 2287 in 1847 to 15725 in 1859, and in 1856 over 20 acres were under cultivation. In 1857 a catalogue of the plants growing in the gardens was published by Newman. A copy of this interesting work is before me. The full title is *Catalogue of Plants in the Royal Society's Gardens, Queens Park, Hobart Town, Tasmania*, by Mr. F. W. Newman, Curator. It is arranged under ten headings viz: Trees and Shrubs, Climbers, Coniferae, Roses, Herbaceous Plants, Bulbs and Tuberous rooted plants, Annuals, Succulents, Fruit Trees, Agricultural Grasses, etc., is well printed and typographical errors are remarkably few. It contains the names of 1620 plants from all parts of the world. Some 70 kinds of Roses were cultivated and the Conifers number 135 of which 27 are Pines. The trees, shrubs and herbs of North America are well represented and it is evident that plants then being introduced to English gardens were quickly obtained for this garden in far off Tasmania.

On the death of Newman in 1859, Francis Abbott who had been apprenticed in the gardens was appointed superintendent and held the post until his death in 1903, then the post remained unfilled until 1911 when the present superintendent, Mr. John Wardman was appointed. Today, the Botanical Gardens are not a credit to the Government and people of Tasmania. Official parsimony long sustained has produced the inevitable results. The once rich collections are dwindling away and with them the usefulness of the gardens as testing and acclimatising

grounds and their attractiveness as a public resort. The staff consists of a Superintendent, head gardener, five laborers and one female clerk, and the total grant for maintenance, including all salaries is £1350 per annum. The annual rainfall of Hobart is only some 24 inches yet the only water supply of the gardens is 1050 ft. of 2-inch piping, a certain amount of 1-inch piping which does not function and a small pond virtually dry during the summer season. In 1920 the gardens were completely without water save that used for the few pot plants in the tiny green-houses. The gardens need a 4-inch water-main and an annual allowance of £2500. They could then fulfill their functions properly and be a delight to visitors and residents.

The time of my visit was Easter, 1921, and being autumn most of the deciduous-leaved trees and shrubs were leafless. On a sloping flat near the superintendent's cottage some tiny lawns of Buffalo-grass were being kept green by aid of a sprinkler, and beds filled with Dahlias, Petunias, Asters, Marigolds, Geraniums, Verbenas, Salvias, Penstemons, Delphiniums and a few other herbs were gay with flowers. A few belated Roses, a bed of Blue Hydrangeas and a fine clump of the rose-colored *Statice rosea* Sm. (*S. Dicksoniana* Hort.) from Natal were virtually the only other flowers. Some of the shrubs and small trees like the Barberries, Crabapples, Thorns and Service Tree were nicely in fruit. The garden everywhere was tidily kept, but in general it was virtually burnt up and except the lawns mentioned not a blade of green grass was to be seen. Many of the trees and shrubs were dead, more were dying and all for the want of water.

The collections, especially of woody plants, is still considerable, the labelling is creditably done, though, as might be expected the north hemisphere plants are often mis-named. Some of the larger groups like Conifers, Oaks, Thorns, Crabapples and their relatives are grouped together and a certain amount of geographical order is observed, there being beds devoted to New Zealand and Australian plants. The Conifers occupy the upper terraces and serve as windbreaks.

The entrance is through ornate iron gates approached from the main road by a short drive which is flanked by conifers and a few broadleaf shrubs and trees. The landscape effect of fairly steep hill-slopes laid out in terraces with winding paths and the broad river at the foot is decidedly good but over-crowding is a marked feature. On the whole the deciduous trees of the northern Hemisphere do not thrive. A few Thorns including the Washington Thorn (*Crataegus phaenopyrum* Med.) and Douglas Thorn (*C. Douglasii* Lindl.) flourish but not so well as the common English Hawthorn. Quantities of the English Oak (*Quercus robur* L.) have been planted in Tasmania but neither in the Botanic Gardens nor elsewhere does it grow into a handsome tree; it is stunted in habit and so too is the Red Oak (*Quercus borealis* var. *maxima* Ashe, *Q. rubra*

Auth., not L.). The best of the deciduous Oaks is *Q. cerris* L., the Turkey Oak. In the gardens are several good specimens of the Cork Oak (*Q. suber* L.), Holm Oak (*Q. ilex* L.), the Himalayan *Q. incana* Roxb. and a fair tree of *Q. virginiana* Mill. The Olive (*Olea europaea* L.) does well and so too does the Wych Elm and the Common Ash (*Fraxinus excelsior* L.), but the Horsechestnut, Sweet Chestnut and Linden do badly. Maples do not thrive though there is a fair collections of nice trees of the Norway Maple. The Bull Bay (*Magnolia grandiflora* L.) does well but the deciduous Magnolias are far from happy. A magnificent *Photinia serrulata* Lindl., 30 feet tall with a spread of 30 feet, is one of the features of the gardens and there are also excellent examples of the New Zealand Cabbage Tree (*Cordyline australis* Hook. f.). Among the Palms good specimens of *Phoenix canariensis* Hort., *Jubaea spectabilis*, H. B. K., *Trachycarpus excelsa* Wendl., *Chamaerops humilis* L., and its variety *elegans*, *Cocos capitata* Mart. and *Washingtonia filifera* Wendl. are growing. Among shrubs are many sorts of Bush Honeysuckle, more or less happy, several Barberries including *Berberis vulgaris* L. heavily laden with scarlet fruit and a few Viburnums among which *Viburnum prunifolium* L. was noteworthy. The Common Box (*Buxus sempervirens* L.) is used as an edging and the Himalayan *Cotoneaster Simonsii* Bak. is used for making hedges and does splendidly. Near the small museum flourishes the largest specimen of the remarkable Elephant's Foot (*Testudinaria elephantipes* Salisb.) I have ever seen.

As a group the Conifers, especially the Pines, are the most interesting trees in the Hobart Botanic Gardens. Among those of the southern Hemisphere only *Araucaria excelsa* R. Br. (Norfolk Island Pine), *A. Bidwillii* Hook. (Bunya-Bunya), *A. Cunninghamii* Sweet (Hoop Pine), the South American *Podocarpus andina* Poepp. (*Prumnopitys elegans* Phil.), and the South African *P. elongata* L. Herit. are really thriving. But the conifers of the north Hemisphere are more at home. Pines in particular do well and there are many really noteworthy specimens in the gardens. Among them a magnificent *Pinus muricata* Don, 60 feet tall with a trunk 9 feet in girth, in perfect health, a wide-spreading *P. Montezumae* Lamb., 45 feet tall and a trunk 7 feet in girth, *P. longifolia* Roxb., 75 feet and 7 feet in girth of trunk and a fine *P. Sabiniana* Dougl., 75 feet by 6 feet in girth are the finest I have seen in Australasia. There are handsome trees 80 feet tall of *P. ponderosa* Dougl. labeled *P. Benthamina* and equally fine trees of *P. canariensis* C. Sm. The Austrian Pine (*P. nigra*) does badly, the Corsican (*P. nigra* var. *Poiretiana* Schneid., *P. laricio* Poir.) and *P. ponderosa* moderately well. There are fair trees of *P. Jeffreyi* Balf. and of *P. pinaster* Ait. (Cluster Pine), a splendid Stoe Pine (*P. pinea* L.), 50 feet tall with a wide-spreading flattened crown and a trunk 8 feet in girth. The Monterey Pine (*P. radiata* Don) flourishes as elsewhere in Australasia, our White Pine (*P. Strobus* L.) does indiffer-



ently but the Bhotan Pine (*P. excelsa* Wall.) thrives. There are also nice trees of *Pinus Coulteri* Don and of the Himalayan *P. Gerardiana* Wall., both coning freely, but a tree of the beautiful *P. patula* Schiede, 40 feet tall and 6 feet in girth of trunk was dying at the top from drought. The Douglas Fir (*Pseudotsuga taxifolia* Brit.) is not happy and of the Spruces and Firs only the Himalayan *Picea Smithiana* Boiss. (*P. morinda* Link) and the Spanish *Abies pinsapo* Boiss flourish. Of these there are fine trees from 50 to 75 feet tall perfect from the ground up. The Crimean *Abies Nordmanniana* Spach and the Himalayan *A. pindrow* Spach do fairly well but the Norway and Sitka Spruces merely exist. None of the Japanese conifers appear to grow well except the variety *elegans* of *Cryptomeria japonica* Don. The Cupressus do well and there are excellent specimens of *Cupressus torulosa* Don and *C. sempervirens* L. and quite good ones of *C. macrocarpa* Hartw. and of the chinese *C. funebris* Endl. The Lawson Cypress (*Chamaecyparis Lawsoniana* Parl.) does very well and so do the Atlas Cedar (*Cedrus atlantica* Manetti) and the Deodar (*C. deodara* Loud.). The Redwood (*Sequoia sempervirens* Endl.) looks very miserable but its relative the Mammoth Tree (*S. gigantea* DC.) is represented by several fine specimens including one fully 60 feet tall and 11 feet in girth of trunk. Several species of Juniper are cultivated and among them shapely trees of *J. drupacea* Labill. and *J. excelsa* Bieb. In the rosary are old rose bushes fifty years old and among them is growing a healthy young tree of *Cunninghamia lanceolata* Hook. This is not an attempt to enumerate all the treasures growing in these old gardens but what has been said is sufficient proof of their interesting character. The fine trees of rare Pines are in themselves worth a long journey to see.

HOBART, TASMANIA, April, 1921.

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## NOTES

**William Purdom.**—News has been received of the death, at Peking, after a short illness on November 7, 1921, of WILLIAM PURDOM, an English gardener, who from 1909 to 1912 made extensive journeys in Chili, Shansi, Shensi and Kansu, to collect material for this Arboretum. Purdom returned to China in 1914 and became associated with the late Reginald Farrar, spending nearly two years with him in collecting plants and seeds in Kansu and the Kokonor region. In 1916 he was appointed to a post in the Chinese Government Forestry Bureau and was later employed by the Ministry of Communications to organize a system of tree-planting by the Chinese Railways, establishing at this time the now flourishing Kin Han Railway forestry station. At the time of his death Purdom was engaged in the organization of a comprehensive forest survey for the Chinese Railways. By botanists Purdom will be remembered by Ber-

*beris Purdomii* Schneider, *Rhododendron Purdomii* Rehder & Wilson, *Prunus Padus pubescens* forma *Purdomii* Koehne, and *Leptodermis Purdomii* Hutchinson.

The following plants first introduced by Purdom have been raised at the Arboretum: *Larix dahurica* var. *Principis-Ruprechtii* Rehder & Wilson, *Picea Meyeri* Rehder & Wilson, *Abies sutchuensis* Rehder & Wilson, *Berberis circumserrata* Schneider, *Berberis Dielsiana* Fedde, *Berberis Gilgiana* Fedde, *Berberis Vernae* Schneider, *Deutzia hypoglauca* Rehder, *Deutzia grandiflora* Bunge, *Indigofera Potaninii* Craib, *Caragana Maximowiczii* Komarov, *Rosa bella* Rehder & Wilson, *Malus baccata* var. *gracilis* Rehder, *Malus robusta* var. *persicifolia* Rehder, *Malus transitoria* Schneider, *Prinsepia uniflora* Batalin, *Paeonia suffruticosa* var. *spondanea* Rehder (Moutan), *Cotoneaster gracilis* Rehder & Wilson, *Viburnum kansuense* Batalin, *Daphne Giraldii* Nitsche.

Purdom sent to the Arboretum 550 packages of the seeds of trees and shrubs; and in the Arboretum Herbarium there are specimens collected by Purdom under eleven hundred numbers.

**E. H. Wilson in East Africa.**—The following notes on some of the important trees of East Tropical Africa are from a letter recently received from Mr. Wilson and written at Monbasa on his return to the coast from a journey in the mountain forests of the interior, undertaken for the purpose of gathering material and information for the Arboretum. From Monbasa Mr. Wilson intended to continue his journey southward via Beira to Rhodesia and Cape Town. From Cape Town he will sail for England, with the intention of being back in the early summer at the Arboretum at the end of his two years' journey.

"The tallest broadleaved tree in the forests west of Nairobi is a species of *Mimusops* which often exceeds 150 ft. in height. It is smooth-barked with a buttressed bole free of branches for a hundred feet or more and the crown is sparse. Next in height among this class of trees is *Pygeum africanum* Hook. f., a handsome tree fully 120 ft. tall. This tree has reddish wood of good quality, a rough dark bark, a flattened round crown, lustrous dark green leaves and a buttressed bole free of branches for two-thirds the height of the tree. The most valuable of all the broadleaved trees of British East Africa is the so-called East African Camphor (*Ocotea usambarensis* Engl.), a truly magnificent tree. It grows about 100 ft. tall and has a wide-spreading flattened crown of massive branches. The bole is clean for from 50 to 75 ft. and is from 15 to 25 ft. in girth, slightly buttressed at the base and clothed with dark scaly bark which is red-brown beneath. The wood is pale- to rich-brown, fragrant, smelling slightly of camphor. This tree favors the tops and slopes of steep ridges and the lumber is difficult to obtain. These three trees are inhabitants of the rain-forest though the two first-named extend into semi-dry regions. Other large trees of these forests are *Ochna* sp., *Panax* sp., *Weihea africana*

Benth., *Rapanea rhododendroides* Mez, *Allophyllus abyssinicus* Radlk., *Heptapleurum* sp. and *Ficus Hochstetteri* Rich.—the last two usually commence life as epiphytes and ultimately completely enclose and strangle their hosts.

In the dry and semi-dry forests *Olea chrysophylla* Lam. and *O. Hochstetteri* Bak. are prominent trees of good size which yield valuable hardwood. In the dry regions, flat-topped Acacias in several species are a feature of the landscape and often form pure and extensive stands especially in savannah regions. In and round Mombasa grow many gigantic Baobabs (*Adansonia*) and the Doum Palm (*Hyphaene*) with its much-branched trunk is also common. In the neighborhood of Nairobi a Croton and a Tree Composite are characteristic trees. The Croton (*C. Elliotianus* Baill.) has horizontal branches and a flattened crown suggestive of Japanese trained trees. The Composite (*Brachylaena Hutchinsii* Hutchins.) is a tree with dioiceous flowers, often over 100 ft. tall by 15 to 20 ft. in girth of trunk, and so far as I know is by far the largest composite in the world. It has a fluted trunk, gray bark and a crown of nondescript shape. The wood is brownish, fragrant and burns with clear flame leaving very little ash. The wood is elastic and easily polished and would serve for the floors of ball-rooms.

The moorland vegetation has characteristics all its own and is quite unlike that of other countries I have visited. Tree Lobelias and Senecios are prominent features and so, too, are numerous small-leaved woody Composites, gray, willow-like Rosaceous shrubs, and a giant Heath with a dense, dark green billowy crown and a remarkable Rosaceous tree (*Brayera anthelmintica* Kunth), with large pinnate, deciduous leaves, huge terminal panicles of greenish flowers, a short trunk and a wide-spreading flattened crown. This is the most alpine of Central African trees and is singularly like a Sumach in appearance. Herbs of course are plentiful and conspicuous and I noted many kinds of everlasting Composites, a Sweetia, a scarlet flowered Gladiolus and a Tritoma.

To me, however, the Juniper and the two Podocarps were the most interesting trees and are the most valuable timber trees in East Africa. The Juniper (*Juniperus procera* Hochst.) is the giant of the genus being sometimes 130 ft. tall and 30 ft. in girth of trunk. It grows in both dry and semi-dry regions and has an altitudinal range from 6500 ft. to 10,000 ft. where it is exceedingly abundant. Occasionally it forms pure forest but more usually it is mixed with the two Olives, with *Podocarpus gracilior* Pilger, *Nuxia congesta* R. Brown and other trees. Most of the Juniper is over-mature, the timber exceedingly faulty from ingrowing bark and fungus, and many of the trees are badly infested by *Loranthus*. The wood which varies from pale to rich cedar-brown, is very fragrant; it is not attacked by white ants, lasts well in the ground, and is excellent for paneling, shingles, window-sashes, etc., but unfortunately it is difficult to nail.



since it cracks and splits readily. Though slightly harder than that of *Juniperus virginiana* L. the wood will do very well for pencils. This African Cedar is a tree with a massive bole, gray, fibrous bark, a wide-spreading crown and rather light green foliage. All in all it is the most valuable tree in the highland forests of Eastern Africa and it is a pity that so much of it is over-mature. *Podocarpus gracilior* is a singularly handsome tree abundant in the semi-dry forests though its distribution is often sharply defined. It is found at altitudes between 7000 and 9000 ft. This *Podocarpus* grows from 80 to 140 ft. tall by 12 to 25 ft. in girth of trunk and has a cylindrical bole clothed with scaly gray bark red-brown below, and a neat rounded crown composed of small branches. The wood is white, lustrous, free of resin and knots, but is somewhat brittle. Trees containing from 5000 to 7000 board feet are common and the maximum is about 10,000 board feet. Owing to the even shape of the bole it is possible to cut large boards and slabs—say from 4 to 5 ft. wide and from 50 to 60 ft. long. The other *Podocarpus* (*P. milan-jiana* Rendle) has rather stronger wood, pale brownish in color but faulty from ingrowing bark. It favors the wetter forests at altitudes from 5000 ft. to 9000 ft. and is distinctly a shade-bearing tree. It is a tree of moderate size, seldom exceeding 80 ft. in height by 12 ft. in girth of trunk, and has gray, fibrous bark and a crown of unequal shape. In many respects it strongly resembles the Japanese *Podocarpus macrophyllus* D. Don but its foliage is much lighter green.

Of these two *Podocarpus* and the Juniper I have a fine series of photographs and plenty of herbarium material. Of most of the other trees mentioned I have photographs and dried material. The Juniper fruits readily but regenerates badly except in open country. I have a nice lot of seed of it which I hope to send you later. This tree will probably grow well in California and in other warm States."

**Additions to the Library.**—To the large number of books published in the 15th, 16th and 17th centuries, for which the Arboretum is indebted to Mrs. J. Montgomery Sears of Boston, can now be added a copy of *HERBARIUS ZU TEUTSCH*, or the German *ORTUS SANITATIS* (called also the smaller *ORTUS*). In the *Transactions of the Bibliographical society*, vol. vi, 1901, Dr. J. F. Payne writes of this edition as follows:

"This work which was the foundation of the numerous publications called *HORTUS SANITATIS*, was printed at Mainz early in 1485. The name of the printer is not given, but the double red shield of Peter Schöffer at the end assigns it to him. Appearing the year after the [Latin] *HERBARIUS*, issued by the same printer, it has been regarded by some authors as a second edition of that work, in German. But really, neither the text nor the illustrations of the two books are the same (though one part shows some resemblance), and as the newer work was completed on the 28th March, 1485, and must have taken a long time to prepare, it would

have been hardly possible in composing it to make much use of a book printed in the previous year. The wide circulation and the celebrity of the later Latin *HORTUS* and its successors, has tended to obscure the peculiar and unique position occupied by this fine folio, the publication of which forms an important land-mark in the history of botanical illustrations, and marks perhaps, the greatest single step ever made in that art. It was not only unsurpassed, but unequalled for nearly half a century."

From the preface it would appear that the originator of the work was a rich man who had travelled extensively in the East, partly for the purpose of studying botany and bringing home drawings of plants, and that under his direction the medical portion was compiled by a learned physician, probably Dr. Johann von Cube, who was town physician of Frankfurt at the end of the 15th century.

"On the second page of the preface occur these words: Und nennen diss buch zu Latin Ortus Sanitatis; uff teutsch ein gart der gesuntheit. ('Call this book in Latin Ortus Sanitatis; in German, a garden of health'.) The colophon, in red states "Disser Herbarius ist czu || mencz gedruet und geen || det uff dem xxviii dage des mercz. Anno M.cccclxxxv.

"It is to be noted that though the name Ortus Sanitatis is given in the preface, this was never used as the actual title of the German work, which is always called in the colophon (where one exists) Herbarius, while later editions (Augsburg 1488, 1493, 1496, 1499, etc.) have as a title on the first leaf the words *HERBARIUS ZU TEUTSCH*. Moreover, in two copies which I have seen with old binding, this is lettered on the outside Herbarius. It is therefore, more correctly called The German *HERBARIUS*, not *ORTUS SANITATIS*."

The copy in the possession of the Arboretum is in old binding, and is lettered "Lib Herb." Mrs. Sears has another copy of this book, in which the plates have been colored, apparently at a much later date, and the only other copy known to be in this country is in the Surgeon-General's Library at Washington.

In the Arboretum Library there are now in addition to Mrs. Sear's recent gift, copies of the following editions of the *ORTUS SANITATIS*:

Mainz, Meydenbach. 1491. *Hain* 8944.

[Strassburg, Prüss. c. 1497.] *Hain* 8941.

[Strassburg, Prüss. c. 1496.] *Hain* 8942.

[*Colophon*: —] Venetiis, Benalius et Cereto de Tridino.  
1511.

[Strassburg, Beck.] 1517.

The Arboretum has recently obtained in London a copy of the work entitled:

Collection de cent Espèces ou Variétés du genre *Camellia* peintes d'après nature, soigneusement lithographiées et coloriées par M<sup>lle</sup>. G. FONTAINE, Bruxelles, Chez A. Mertens, Libraire Éditeur. 1845.



The well executed life-sized colored plates are accompanied by description and historical text which may have been prepared by Mlle. Fontaine as it is not accompanied by an author's name.

This appears to be a rare book. It is not mentioned by Pritzel, and is not found in the catalogues of the libraries of the British Museum (Nat. Hist. Dept.), of the Royal Gardens of Kew, and of the Department of Agriculture of the United States; it is not mentioned in the Bradley Bibliography.